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CLINICAL LECTURES AND ESSAYS
ON
DISEASES OF THE NERVOUS SYSTEM

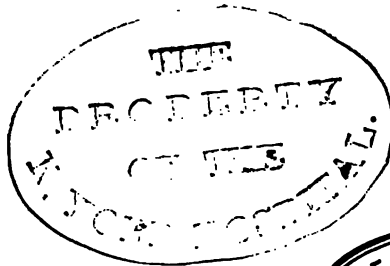
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BY

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SENIOR PHYSICIAN TO ST THOMAS'S HOSPITAL



LONDON
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1888

TO

THOMAS ALFRED BARKER, M.D. CANTAB. & EDIN.

F.R.C.P.

CONSULTING PHYSICIAN TO ST THOMAS'S HOSPITAL

MY EARLIEST TEACHER OF MEDICINE

I venture to dedicate this book

IN TOKEN OF AFFECTION AND OF ADMIRATION FOR THE ACCURACY OF

DIAGNOSIS AND THE DIRECTNESS AND SIMPLICITY OF TREATMENT

WHICH RENDERED HIS CLINICAL INSTRUCTION SO VALUABLE

TO MYSELF AND MANY OTHERS OF HIS OLD PUPILS

J. S. B.

PREFACE.

WHILE engaged in writing my work on Medicine, the thought was continually before me that, on its completion, I might supplement it by the publication in a separate volume of series of cases illustrative of its different chapters, and of the facts and opinions stated in them. And, as a matter of fact, I did after its publication begin to collect cases with this object.

I never carried out my intention, and I never shall carry it out. At the same time this little book is in no inconsiderable degree the result of it. For while, on the one hand, I found that the mere accumulating of typical cases in illustration of a work already written would prove a wearisome and barren labour, on the other hand, I became more and more impressed with the fact that the chief educational interest of clinical work lies in the progressive enlargement of one's knowledge, and in learning the lessons which groups of cases teach us, irrespective of whether the lessons are or are not in accordance with preconceived opinions and former teaching.

Hence my cases have no supplemental connection with my larger work, but have simply been made the basis of clinical and other lectures which I have delivered from time to time, and of essays or papers which I have published or prepared for publication.

I do not pretend that, even so, I have succeeded in accomplishing anything of much value. Still, my cases are selected cases, and have been instructive to me and to my pupils ; and I venture, therefore, to hope that at any rate some of the papers included in the present volume may prove of sufficient interest to justify its publication to my readers.

J. S. B.

13 OLD BURLINGTON STREET :

November 1888.



CHAPTER I.

CASE	PAGE
ON HYSTERIA AND ITS COUNTERFEIT PRESENTMENTS .	1
1. Hysterical aphonia; inarticulateness (aphemia); hemianæsthesia (including loss of taste and smell and colour blindness) and fits; chorea	2
2. Hysterical fits in a male; hysterical aphemia	6
[31. Aphemia of nine months' duration, in which speech was restored by the education of the organs of articulation	7 (and 93)]
3. Choreia in a boy; hysterical fits	8
4. Hysterical squint	10
5. Right facial palsy, with weakness and numbness of opposite arm and leg (? hysterical)	10
[29. Functional ophthalmoplegia externa; right hemiplegia; headache and sickness, followed by partial right hemianæsthesia, and epileptic fits preceded by prolonged rises of temperature; chorea during the progress of patient's illness. Recovery	11 (and 76 and 91)]
6. Hysterical stammering and aphasia	12
7. Hysteria; rhythmical spasmodic movements chiefly on right side; shifting hemianæsthesia, with persistent colour-blindness on right side, and fits attended with incoherent talk	14
8. Hysterical somnambulism; analgesia, &c.	17
9. Epileptic somnambulism	18
10. Hysteria, convulsions, catalepsy, contracture, &c.; intermittent maniacal attacks	19
11. Epileptic fits terminating in laughter	21
12. Hysterical aphonia (?) and dyspnœa; tracheotomy, with perforation of pleura and death from pneumothorax, etc.	22 and 35
13. Hysterical asthma associated with hystero-epilepsy, etc.	23
14. Hysterical rapidity of breathing	23
[32. Paroxysmal hurry of heart of some years' duration	24 (and 105)]
15. Rapid action of heart in enteric fever	25
16. Rapid action of heart in pernicious anæmia	25

CHAPTER II.

CASES OF HYSTERIA, BEING A SEQUEL TO THE
FOREGOING PAPER PAGE

CASE		
17.	Hysteria; paraplegia of five years', aphonia of two years', and paralysis of the arms of eighteen months' duration, rapidly cured by the faradic current	31
18.	Hysteria; periodical fits, during which the patient repeated with volubility the conversations she had heard during the intervals	34
[12.	Hysterical aphonia (?) and dyspnoea; tracheotomy with perforation of pleura and death from pneumothorax, etc. 22 and 35]	
19.	Hysteria; functional, inspiratory dyspnoea and stridor, with loss of taste and anaesthesia.	36

CHAPTER III.

ON THE FUNCTIONAL VOMITING OF HYSTERIA 40

20.	Hysterical vomiting	40
21.	Hysterical vomiting	40
22.	Occasional spasm of the œsophagus, and occasional delay of matters in that tube	42
23.	Spasmodic stricture of œsophagus cured by passing a bougie	42
24.	Dilatation of the œsophagus, with persistent vomiting. Death. Autopsy	44
25.	Hysterical vomiting due to spasm of lower end of œsophagus. Cure	47

CHAPTER IV.

ON A PECULIAR FORM OF CHOKING, CAUSED MAINLY
BY SWALLOWING FLUIDS 53

26.	Gangrenous cavity behind the root of the lung, opening into the left bronchus and œsophagus; choking. Death. Autopsy	53
27.	Paralysis of arytenoid muscle, etc., with choking when swallowing fluids	57
[115.	Alcoholic multiple neuritis with paralysis of diaphragm, and difficulty in swallowing fluids. Partial recovery	59 (and 357)]

CHAPTER V.

CASES OF FUNCTIONAL NERVOUS DISORDER, IN WHICH
THERE WERE OPHTHALMOPLÉGIA EXTERNA, HEMI-
PLÉGIA, HEMI-ANÆSTHESIA, HIGH TEMPERATURE,
EPILEPTIFORM FITS, ETC. 61

28.	Graves's disease, followed by ophthalmoplegia externa, right hemianæsthesia (involving organs of special sense), headache, sickness, and persistent high temperature, and subse-
-----	--

CONTENTS

xi

CASE	PAGE
quently by right hemiplegia, epileptic fits, bleeding from the ears, etc. Death from bronchitis. Autopsy	69 (and 141)
29. Functional ophthalmoplegia externa; right hemiplegia, headache and sickness, followed by partial right hemianæsthesia, and epileptic fits preceded by prolonged rises of temperature; chorea during the progress of patient's illness. Recovery	76 and 99 (and 11)
30. Ophthalmoplegia externa and interna; partial anæsthesia of head and neck and chest; epileptic fits; gastric crises; and attacks of intense dyspnœa dependent on paralysis of the abductors of the vocal cords	87

CHAPTER VI.

CASE OF APHEMIA OF NINE MONTHS' DURATION, IN WHICH SPEECH WAS RESTORED BY THE EDUCATION OF THE ORGANS OF ARTICULATION	93
---	----

31. Aphemia of nine months' duration, in which speech was restored by the education of the organs of articulation . . . 93 (and 7)

CHAPTER VII.

ON RECURRENT PALPITATION OF EXTREME RAPIDITY IN PERSONS OTHERWISE APPARENTLY HEALTHY	104
--	-----

32. Paroxysmal hurry of heart of some years' duration . . . 105 (and 24)
33. Paroxysmal hurry of heart; double aortic and mitral disease, and probably aortic aneurism; ascites. Death . . . 107
34. Rapid action of heart; goitre; restlessness; albuminuria. Death . . . 109
35. Paroxysmal hurry of heart and restlessness of fifteen years' duration. Death, with symptoms of cardiac obstruction . . . 112
36. Rapid action of heart; sunstroke (?); headache . . . 118
37. Paroxysmal hurry of heart of seven years' standing. Death, with symptoms of cardiac obstruction . . . 120
38. Rapid action of heart. Sudden death. Autopsy . . . 123
39. Paroxysmal palpitation, apparently due to strain . . . 128
40. Paroxysmal palpitation of twenty years' standing, apparently due to strain . . . 130
41. Paroxysmal hurry of heart of fourteen years' duration. Death mainly from bronchitis . . . 130

CHAPTER VIII.

SOME CASES OF GRAVES'S DISEASE	139
--------------------------------	-----

42. Graves's disease, caused by exposure to cold . . . 139
43. Recovery from Graves's disease . . . 140
44. Partial recovery from Graves's disease . . . 140

CASE	PAGE
45. Graves's disease; thyroid body (especially right lobe) much enlarged and compressing trachea; paroxysmal dyspnoea. Death during an attack. Autopsy	142
46. Graves's disease; thyroid body (especially right lobe) enlarged; compression of trachea with stridor; disease of aortic, mitral, and tricuspid valves; removal of isthmus of thyroid, followed by atrophy of the gland. Death from heart disease. Autopsy	144
47. Exophthalmic goitre; right lobe chiefly enlarged; rheumatic endocarditis; infarcts in spleen. Death, mainly from the effects of heart-disease. Autopsy	149

CHAPTER IX.

CASES OF RECOVERY FROM SYMPTOMS POINTING TO THE
PRESENCE OF PROGRESSIVE ORGANIC CEREBRAL
DISEASE

48. Tubercular peritonitis (?); tubercular meningitis, or tubercular tumour of the brain (?). Recovery	153
49. Tubercular meningitis (?). Recovery	156
50. Symptoms pointing to progressive disease in the neighbourhood of the fourth ventricle, coming on gradually, and finally subsiding under treatment	158

CHAPTER X.

ON SPEEDY RECOVERY FROM THE EFFECTS OF
CEREBRAL EMBOLISM

51. Heart-disease from rheumatism, followed by temporary right-sided hemiplegia and aphasia, and four months later by permanent right-sided hemiplegia with temporary aphasia.	165
52. Mitral disease; sudden obstruction of aorta with disappearance of pulsation from abdominal aorta and arteries of both lower extremities and of left forearm; paralysis of legs; temporary suppression of urine. Partial recovery, followed by paralysis of certain muscles of eyes and right facial nerve, of short duration	167
53. Temporary tendency to cross paralysis of the face, due probably to embolism	169
54. Recovery from cerebral embolism	170
55. Recovery from cerebral embolism	171

CHAPTER XI.

ON RECOVERY FROM IDIOPATHIC CEREBRO-SPINAL
MENINGITIS

56. Cerebro-spinal meningitis. Recovery	173
57. Cerebro-spinal meningitis. Recovery	174
58. Cerebro-spinal meningitis. Death. Autopsy	176
59. Cerebro-spinal meningitis. Recovery	181

CHAPTERS XII. AND XIII.

PAGE

STUDIES OF A CASE OF CEREBRAL DISEASE . 184, 194

1. *Thrombosis of the Lateral Sinuses.*2. *Hysterical Anæsthesia, etc.*

CASE

60. Anæmia; epileptic fits; headache; sickness; optic neuritis; severe pain, first in neighbourhood of right ear, later in neighbourhood of left (thrombosis of lateral sinuses?); phlebitis in leg. Improvement 184
- 60a. Hysterical anæsthesia, etc. 194
61. Thrombosis of lateral sinus and internal jugular; headache, sickness, optic neuritis, and temporary hemiplegia; early pregnancy. Death from syncope. Autopsy 189

CHAPTER XIV.

ON DEATH FROM CEREBRAL HÆMORRHAGE IN PURPURA . 200

62. Purpura; effusion of blood into brain. Death. Autopsy . 203
63. Purpura; effusion of blood into brain. Death. Autopsy . 205

CHAPTER XV.

ON BILATERAL FACIAL PALSY 208

64. Injury to head, probably fracture of base, followed by hemiplegia, squint, deafness, and bilateral facial palsy. Partial recovery 208
65. Injury to head, followed by bilateral facial palsy; persistent desire to defecate; gradually increasing dulness, apathy and emaciation. Death. Autopsy 210
66. Fracture of skull from falling on back of head, with damage to brain from contre-coup. Death. Autopsy 214

CHAPTER XVI.

TUBERCULAR MENINGITIS 218

67. Tubercular pleurisy, apparently cured, followed by tubercular meningitis, optic neuritis, facial paralysis, convulsions. Death. Autopsy 225
68. Two consecutive attacks of pleurisy, one on each side; paracentesis, followed by convalescence in each case; subsequent tubercular meningitis; miliary tubercles in lungs and pleuræ. Death. Autopsy 227
69. Old tuberculosis of lung and bowel; tubercular meningitis. Death. Autopsy 228
70. General tuberculosis; tubercle of the convex surface of the cerebrum; effusion into the ventricles; optic neuritis; convulsions. Death. Autopsy 229

CASE	PAGE
71. Tubercular meningitis; first symptom a fit, then drowsiness, partial coma, affection of sight, and paralysis of muscles of right eyeball. Death. Autopsy	231
72. Tubercular meningitis; symptoms of very short duration; headache, drowsiness, and incoherence; affection of ocular muscles. Death. Autopsy	233
73. Tubercle of brain; tubercular meningitis; history of otorrhœa; subcutaneous abscesses; extreme pain in head; optic neuritis. Death. Autopsy	234
74. Tubercular tumours in the brain; deposit of miliary tubercles in the fissures of Sylvius, without meningitis; dropsical accumulation in the ventricles; great drowsiness; absence of fits; paralysis and optic neuritis. Death. Autopsy	237
75. Tubercular meningitis; convulsions; optic neuritis; partial paralysis of right third nerve, etc. Death, with high temperature. Autopsy	238
76. Tubercular meningitis; symptoms resembling those of delirium tremens; double vision; no other paralysis; no convulsions. Death. Autopsy	240

CHAPTER XVII.

ON TUBERCLE OF THE CEREBELLUM	243
77. Tubercular tumours of cerebellum, and dropsy of ventricles; headache; vomiting; giddiness; optic neuritis; blindness; absence of cerebellar gait; finally epileptiform attacks, coma, and death. Autopsy	246
78. Tubercular tumour of cerebellum; headache; vomiting; giddiness; paralysis of right external rectus; optic neuritis; absence of cerebellar gait. Death from coma. Autopsy	248
79. Tubercular tumour of cerebellum; effusion into the ventricles; headache; sickness; giddiness; optic neuritis; impairment of sight; paralysis of both internal recti and of right side of tongue; no fits; absence of staggering; coma. Death. Autopsy	250
80. Tubercle of cerebellum, followed by tubercular meningitis; pain in head, with loss of power of walking of two years' duration, followed by symptoms of tubercular meningitis, and death. Autopsy	252

CHAPTER XVIII.

ON UNRECOGNISED OR MASKED CEREBRAL TUBERCULOSIS	255
81. Tubercular meningitis; symptoms following immediately on a blow on the head. Death. Autopsy	256
82. Tubercular meningitis; symptoms coming on after a blow. Death. Autopsy	257

CONTENTS

XV

CASE	PAGE
83. Old ear-disease; blow on lower jaw followed by development of abscess of brain	259
84. Caries of temporal bone; facial palsy; tubercular tumour in brain; pulmonary tuberculosis. Death, apparently from exhaustion. Autopsy	260
85. Tubercular meningitis associated with chronic otorrhœa; psoas abscess; convulsions; coma; paralysis of both external recti and of superior rectus and levator palpebræ of right side. Death. Autopsy	261
86. Caries of sphenoid bone with protrusion of eyeball; softening of brain and meningeal tubercles; caries of dorsal vertebrae and paralysis. Death. Autopsy	264

CHAPTER XIX.

CASES OF TUMOUR OF THE CORPUS CALLOSUM	269
87. Tumour of corpus callosum extending mainly into left centrum ovale; right hemiplegia; loss of memory and intelligence; drowsiness; coma. Death. Autopsy	276
88. Tumour of corpus callosum and both hemispheres, and on the left side involving the frontal convolutions; right hemiplegia; aphasia; optic neuritis; rhythmical tremors; stupidity. Death, with high temperature. Autopsy	278
89. Tumour of corpus callosum, extending into the white matter of the hemispheres; imperfect paralysis, mainly of the left side; difficulty of speech; great drowsiness and stupidity. Death. Autopsy	280
90. Tumour springing from floor of right cerebral ventricle, and involving septum lucidum, fornix, and corpus callosum; headache; optic neuritis; blindness; left hemiplegia; drowsiness; coma. Death. Autopsy	283
91. Tumour of corpus callosum; epileptic fits. Death. Autopsy	286

CHAPTER XX.

ON TUMOURS INVOLVING THE PARTS IN THE NEIGH- BOURHOOD OF THE THIRD AND FOURTH VEN- TRICLES AND THE AQUEDUCT OF SYLVIVS	289
92. Tubercular tumour of corpora quadrigemina, followed by tuber- cular meningitis; paralysis of both third nerves, with ptosis, and tremors of head and neck, arms and legs; no fits; sickness and headache absent until occurrence of menin- gitis; no optic neuritis. Death. Autopsy.	296
93. Tumour of valve of Vieussens, involving cerebellum and corpora quadrigemina, and adherent to floor of fourth ven- tricle; similar growth in dura mater of base; blindness, optici neuritis, paralysis of ocular muscles, deafness, trem rs	

CASE	PAGE
of head and limbs, and loss of power in limbs; mental affection; discharge from right ear. Death. Autopsy . . .	299
94. Tubercular mass in third ventricle involving both thalami and followed by tubercular meningitis; tremors and rigidity of arms and legs; drowsiness; irritability; optic neuritis; slight facial palsy; convulsions, coma, and elevation of temperature coming on with the meningitis. Death. Autopsy . . .	308
95. Tubercular mass in left lobe of cerebellum; effusion of fluid into ventricles; inability to walk; tremors of arms and head; optic neuritis and blindness; frequent epileptiform attacks; headache, etc. Death. Autopsy . . .	305
96. Chronic hydrocephalus; dropsical accumulations in lateral and third ventricles, in fourth ventricle, and in central spinal canal; weakness of intellect; stiffness of neck; feeble, tottering gait; epileptiform fits. Death. Autopsy . . .	308

CHAPTER XXI

ON SOFTENING OF THE PONS, CRURA CEREBRI, AND
NEIGHBOURING PARTS 310

97. Secondary syphilis; disease of right posterior cerebral artery and softening of right crus cerebri, optic thalamus, etc.; left hemiplegia; paralysis of right ocular muscles. Death. Autopsy	319
98. Acute softening of right half of pons Varolii; left hemiplegia; partial paralysis of left third nerve, etc.; coma and great rise of temperature before death. Autopsy	321
99. Softening of right crus cerebri and lenticular nucleus; left hemiplegia; paralysis of right external and left internal rectus, and, later, of right facial and right hypoglossal nerves; nystagmus; giddiness; headache; emotional and mental disturbance. Death. Autopsy	323
100. Thrombosis of basilar artery; softening of anterior part of pons; left hemiplegia. Death from bronchitis. Autopsy	325
101. Softening of medulla oblongata; tubercle in lungs; ulceration of mitral valve; paralysis of left side; loss of power of articulation; conjugate deviation of eyes to left; nystagmus. Death. Autopsy	328
102. Thrombosis of basilar artery and softening of left optic thalamus, posterior part of caudate nucleus, and posterior third of internal capsule; apoplectic fit, followed by loss of speech, paralysis of lower part of left side of face, with twitching, mainly on left side of body; paralysis of right third nerve with conjugate (?) deviation of eyes to right, and spasm of fourth nerve. Death. Autopsy	328

CHAPTER XXII.

CASE	ON MYELITIS.	PAGE
103.	Extensive myelitis, causing paralysis of arms, legs, and trunk-muscles; anæsthesia of the lower part of the body and extreme wasting of muscles. Incomplete recovery . . .	330
104.	Numbness and sense of coldness in the lower extremities, due apparently to slight myelitis. Recovery . . .	334
105.	Motor paraplegia involving the lower extremities and sphincters of the rectum and bladder, due apparently to myelitis. Incomplete recovery . . .	335
106.	Optic neuritis and blindness, followed by ascending spinal paralysis, due to inflammation of the optic nerves, chiasma and tracts, and myelitis. Death. Autopsy . . .	337
107.	Paraplegia followed by hemiplegia, due to myelitis and cerebral softening. Death. Autopsy . . .	339
108.	Paralysis of one lower extremity, anæsthesia of the other, with a zone of anæsthesia around the waist; due presumably to myelitis. Incomplete recovery . . .	341

CHAPTER XXIII.

ON DIPHTHERITIC AND RELATED FORMS OF PARALYSIS. 346

109.	Diphtheritic paralysis, with anæsthesia of certain circumscribed areas in the middle line of the body, and partial paralysis of the vocal cords and respiratory muscles. Recovery . .	346
110.	Diphtheritic paralysis; numbness of upper lip and absence of knee-jerks. Recovery.	348
111.	Diphtheritic paralysis; weakness of external recti and nystagmus; with exaggeration of tendon reflexes continuing late into convalescence. Recovery	350
112.	Diphtheritic paralysis; absence of knee-jerks; paralysis of left portio dura. Recovery	352
113.	Diphtheritic paralysis; electrical examination of muscles. Recovery	352
114.	Multiple neuritis probably due to alcoholism, but coming on in the course of an attack of quinsy. Partial recovery . .	355
115.	Alcoholic multiple neuritis, with paralysis of diaphragm, and difficulty in swallowing fluids. Partial recovery 357 (and 59)	
116.	Multiple neuritis or diffused myelitis of uncertain origin, presenting some resemblance to diphtheritic paralysis and to kakke. Recovery	359

CHAPTER XXIV.

CASE	PAGE
ON THE EARLY RECOGNITION OF GENERAL PARALYSIS OF THE INSANE, AND THE RELATIONS BETWEEN THIS DISEASE, TABES DORSALIS, AND DISSEMINATED SCLEROSIS.	363
117. General paralysis of the insane, commencing with epileptic attacks. Death	368
118. General paralysis of the insane, attended with exaggeration of knee-jerks and ankle-clonus and with attacks of epileptic somnambulism. Death	369
119. General paralysis of the insane; exaggeration of tendon reflexes. Death	370
120. General paralysis of the insane (?); variation in condition of tendon reflexes, and of action of pupils. Death	371
121. General paralysis of the insane (?); absence of tendon reflexes; ophthalmoplegia interna and ptosis. Death. Autopsy	373
122. Early stage of general paralysis of the insane (?)	374
123. Early stage of general paralysis of the insane (?); great exaggeration of tendon and of sensory reflexes	376
124. Tabes dorsalis; inco-ordination, absence of tendon reflexes, gastric and rectal crises, ophthalmoplegia interna and externa, and hysterical mental state	377
125. Tabes dorsalis; preceded by mental disturbance; inco-ordination, hypochondriac distress, absence of tendon reflexes, no affection of pupils	378
126. Tabes dorsalis; inco-ordination, gastric crises, absence of tendon reflexes, epileptiform seizures; no affection of pupils	379
127. Tabes dorsalis; lightning pains, gastric crises, Argyll-Robertson pupils, epileptic fits, absence of knee-jerks. No inco-ordination of movement	380

CHAPTER XXV.

ON SO-CALLED 'PAINFUL' PARAPLEGIA.	382
128. Malignant disease of vertebræ; severe pain; paraplegia. Death	382 and 397 (<i>note</i>)
129. Neuralgia about kidney and ovary	383
130. Malignant disease connected with lumbar vertebræ, and in posterior mediastinum; paraplegia; pulmonary symptoms. Death. Autopsy	385
131. Amputation of left arm for sarcoma of humerus; secondary sarcoma of lumbar vertebræ, causing paraplegia; and of left thigh-bone, permitting of spontaneous fracture, followed by suppuration, etc. Death. Autopsy	388

CONTENTS

xix

CASE	PAGE
182. Sarcoma of periosteum of os innominatum, with secondary growths in liver, kidneys, lungs, and elsewhere; paraplegia. Death. Autopsy	891
183. Sarcomatous tumour of periosteum of ilium and ischium, with paralysis and wasting of leg; secondary growths in lungs. Death. Autopsy	898
184. Growth, probably sarcomatous, of venter of right ilium. Death. Autopsy	895
185. Sarcomatous tumour of the great omentum; secondary growths in ribs and upper dorsal and first cervical vertebræ; paraplegia; unilateral sweating. Death with hyperpyrexia. Autopsy	899

DISEASES OF THE NERVOUS SYSTEM.

I.

ON HYSTERIA AND ITS COUNTERFEIT PRESENTMENTS.¹

It has often happened to me, when I have determined to speak or write on some special subject with which I had thought I was familiar, that, as I have pondered upon it with the object of bringing my facts and fancies into due mutual relation so that I might place them in the form of a compact and intelligible picture before my auditors or my readers, I have found my task grow more and more difficult with thinking upon it; I have found matters which I had perhaps hastily clothed with importance dwindle into insignificance; I have found what had seemed incidental and subsidiary questions assuming fundamental importance, and pressing for solution; and I have discovered that, if I wanted to deal with my subject intelligibly and adequately, I should have to bestow much more contemplation upon it than I had originally intended, and to treat it on different principles from those which suggested themselves to my mind in the first instance.

So it proved on the present occasion. It would be an easy matter, I thought, when I decided on the title of my lecture, to collect out of my experience a series of cases of hysteria

¹ *The Cavendish Lecture*, delivered before the West London Medico-Chirurgical Society, June 5, 1885.

and a parallel series which were not hysterical, to compare them, and to consider the lessons which such a comparison might teach. But as I proceeded with my self-imposed task, and began to bring into mental juxtaposition cases which I had regarded as hysterical, and cases which I had regarded as not hysterical, I was compelled to ask myself more definitely than I had ever done before what were my grounds for applying the epithet 'hysterical' to certain cases and for withholding it from certain other cases. I pondered over the matter; I puzzled myself; I came to conclusions that did not satisfy me; and at length, having wasted much time over it, I decided, after all, to treat my subject from the superficial point of view from which I had at first regarded it, and to reserve what little I had to say upon its more abstruse aspects for the close of my lecture.

I shall not attempt, then, at the present moment to define hysteria, or to consider in what respects hysterical disorders of the nervous system differ from other functional nervous derangements, or how they may be distinguished clinically from these and other groups of symptoms due to structural disease of the nervous centres, or of the nerves. But I shall assume, as is generally admitted, that hysteria represents an unstable condition of the nervous functions, arising independently of organic changes in the nervous system; in which at one time or another one or other part, or several parts, of the nervous organism may be temporarily affected in various ways; but in regard to which, partly from the conditions under which the symptoms of the disease arise, partly from the emotional state which is generally present, and partly from peculiarities in the symptoms themselves, in their mutual relations and in their course, there is, as a general rule, little difficulty in diagnosis. And I proceed to describe a selection of cases which, on the grounds above stated, I have reason to regard as hysterical, and to compare them generally, or in some of their most striking symptoms, with cases which, so far as I know, would not generally be placed in that category.

1. Mary D., an emotional girl, nineteen years of age, was under my care for two or three months in the latter part of

1882. She was suffering from hysterical aphonia; besides which she presented a slight external squint of the left eye, and a narrowing of the left palpebral fissure and of the left side of the mouth, associated with a little twitching in the facial muscles of the same side. The aphonia was of recent origin, but no history could be obtained with regard to the affection of the face and eye. No material improvement took place. She came under my care a second time towards the end of 1883. She was still aphonic, and still presented her old facial peculiarities, but she was suffering from vomiting and emaciation, and from hysterical fits attended with much violence of convulsions. She was subjected to the Weir-Mitchell method of treatment, and at the end of three months left the hospital much improved, excepting in the symptoms for which she was originally admitted. On November 21st, 1884, she became my patient for the third time. She had remained aphonic, but suddenly, some three weeks before admission, had lost the power of articulation as well. She was still a very emotional young lady, with slight external squint of the left eye, a little narrowing of the left palpebral fissure (which Mr. Nettleship considered to be due to partial ptosis), some narrowing of the left side of the mouth associated with constant twitching of the angle, and a fidgety manner. She could not phonate, excepting a little when she laughed or coughed, neither could she articulate; indeed, when asked to speak she merely moved her lips vaguely, as though not comprehending how to adapt them to the utterance of articulate language, but there was no paralysis of the larynx or of the mouth or tongue. Dr. Semon found that the vocal cords moved with the utmost freedom, that they often came into close juxtaposition, and that sometimes, when apparently efforts were being made to phonate, the rima glottidis became obliterated. The lips and tongue and soft palate, for all purposes but speech, were completely under her control. But though she could not speak, she understood what was said, and she could answer readily in writing. In addition to the above symptoms, it was discovered that she had anæsthesia throughout the left side (head, neck, arm, trunk, and leg), that she could neither taste nor feel with the left side of the

tongue, that she could not smell with the left nostril, and that the perception of colours with the left eye was imperfect. There was complete absence of sensation and of reflex excitability in the soft palate and pharynx. The left ovarian region was tender. No very marked change occurred for some time. There was a little variation in the degree and distribution of the hemianæsthesia; and on one occasion, under the influence of a powerful magnet, there was temporary partial transference. I showed her and taught her how by smacking her lips, by similar action of her tongue, and by breathing through her upper row of teeth when resting on her lower lip, she could utter the essential consonantal sounds of *p*, *t*, and *f* respectively, but she made no further advance towards speech. She suffered much and constantly from headache, and occasionally from sickness; and early in January had a severe hysterical fit, in which she was violently convulsed and very rigid, but remained sensible. It ended in a fit of crying. After this she complained very much of headache and sickness, seemed ill, and ultimately took to her bed. She appeared still to be suffering thus when suddenly, late in the evening of March 10th, she called out 'Sister,' and at once the floodgates of her speech were opened, and she talked so volubly and incessantly that she had to be removed to a small ward for the night. From this time she improved rapidly in nearly all respects. Her headache and vomiting gradually ceased. She became bright and cheerful, and useful in the ward, and looked and conducted herself like a sensible girl. But the paralytic phenomena on the left side of the face remained unchanged; and she was still anæsthetic, void of taste and smell, and partially colour-blind when, early in April, she was sent to a convalescent home.

Unfortunately, the history of the case does not end here; for, three or four weeks afterwards she was brought back to the hospital with recurrence of aphonia and aphemia and, additionally, with somewhat severe general chorea. It will be recollected that on former occasions her manner had been fidgety; but her movements were not then characteristic, they were rather sudden and impulsive. But now they were typically choreic, and involved not merely the limbs, but the

trunk, the head and neck, the face, the eyes, and the tongue. It was stated that the return of symptoms was due to her having been suddenly roused from sleep by one of her fellow-convalescents. She had never, so far as I know, had chorea previously; she had never had rheumatism; and no evidence of cardiac disease was ever detected. Within the last few weeks she has again suddenly regained speech and voice; but she is still under treatment for the chorea, which is improving, and for the anæsthesia and paralysis.

Now, that the above is essentially a case of hysteria will be generally allowed. The emotional character of the girl; the aphonia corresponding accurately with the aphonia so often observed in hysteria; the hemianæsthesia, with involvement of the senses of smell, taste, and sight on the same side; the ovarian tenderness; the characteristic fits; and the rapid and unexpected variations in the symptoms—all furnish evidence of the correctness of that view. But was the aphemia also hysterical? Is the chorea hysterical? Are the persistent paralytic or spasmodic phenomena on the left side of the face hysterical?

That the aphemia was functional, and presumably therefore hysterical, cannot, I think, be doubted. The history of the case shows it. But aphemia is rare as an item of hysteria. At any rate, I have only once before met with it in a definite form; while aphonia is common. And yet when one considers the nature of the nervous disturbances by which aphonia and aphemia are respectively caused, and the close functional relationship there is between these two factors of speech, it seems odd that aphemia should not be a more common outcome of hysteria, and more often associated with hysterical aphonia than it is. It has been shown in this case, as I believe it has been shown in many other such cases, that there was no paralysis in the vocal cords; which could be brought into the most complete apposition, and into the position therefore in which phonation could not have been helped had the patient managed to breathe forcibly at the suitable moment. The defect was a hindrance to the proper transmission of the mental impulses to phonate to the ministerial centre by means of which the complex group of actions which

subserve phonation are automatically coördinated, or a failure of this centre to act, or an impediment to the passage of the duly coördinated impulses along its efferent nerves. It has been shown also that there was no real paralysis of the organs of articulation. She understood speech, she could write, she could read, she was at no loss for words; but her organs of articulation, though free to move, did not respond to her mental impulses to speak. In fact in this case, as in the other, the defect depended not on any default of the supreme centre, but on some incompetence in a subordinate coördinating centre, or on some impediment to the transmission of impulses either between the supreme centre of speech and this coördinating centre, or between the last and the muscles it should control. That the nervous defect was in both cases independent of any structural change in the parts concerned, and involved simply what may be termed a hitch in the mechanism by which articulation and phonation are effected, is proved by the sudden temporary cures of the aphonia under the influence of galvanism, and the suddenness of onset and the suddenness of disappearance of both affections. The only other case of hysterical aphemia which I can recall is as follows:—A gentleman, about fifty-five years of age, with whom I was well acquainted, had been liable for many years to occasional fits, determined by mental excitement, which every doctor who had seen him in them regarded as hysterical, and which, from the description given to me, I thought were undoubtedly hysterical. On the occasion to which I refer there had been a serious panic on the Stock Exchange, and for some time it had been doubtful whether, through defaulting debtors, he would not lose a very large portion of his fortune. The excitement induced one of his so-called 'hysterical' attacks, and this was followed for the first and only time by a total loss of the power of uttering articulate language, which lasted for several hours, and was then suddenly recovered from. He had no paralysis at the time, was quite sensible, could understand well all that was said to him, and could express himself accurately in writing.

But the same affection of speech may result from organic disease implicating the centre or tracts of nerve-tissue, presumably disturbed functionally in the cases just quoted.

In 1870¹ I brought before the Clinical Society a very interesting case of the kind. The steward of a steam-packet was attacked suddenly, while passing through the Straits of Banca, with a series of severe epileptic fits; on his emergence from which his limbs were powerless, he was stone-deaf, and he could not speak. He was taken shortly afterwards to the hospital at Singapore, and was then still deaf and unable to speak, and paralysed on the left side. There was also slight right hemiplegia. He remained in hospital for some months, improved in many respects, and then came to England. He was received into St. Thomas's immediately on his arrival in this country, and just nine months after the onset of his illness. At this time he had manifest weakness in the left leg, complained of pain at the back of the head, and was unable to utter any articulate sound. But he had no paralysis of the organs of speech, he could understand perfectly, and he could keep up a conversation in writing. He had recovered his hearing, and was also fairly well in all other respects. It was obvious that his inability to speak depended neither upon paralysis of the organs of speech nor on affection of the supreme centre of speech; but was due to some interference with the transmission of the impulses to speak from the supreme centre either towards or through the centre which regulates the mechanical details of speech. He had been speechless for nine months, and was no nearer speaking now than he was at the beginning of his illness. But he was a sensible man and (as I before mentioned) had complete control over the organs of speech for all other purposes than those of speech; and I determined therefore to endeavour to teach him to speak. I pointed out to my class and to him that the utterance of articulate sounds is a mere mechanical art; that for each letter-sound the organs of speech have to be arranged in a particular manner, and that if thus arranged, and their owner breathes or phonates, or suddenly opens or closes the oral passage, as the case may be, he cannot help uttering the articulate sound due to the peculiar arrangement of the parts at the time. And I illustrated my meaning by showing him, as I showed Mary D., how, by certain simple manœuvres,

¹ See page 93.

certain simple consonantal sounds—such as those of *p*, *t*, and *f*—could be uttered ; and how, by accompanying these several acts with phonation, *p*, *t*, and *f* become converted into *b*, *d*, and *v*. I will not occupy your time by detailing how I, by repeated and progressive lessons, and he, by persistent and determined efforts, succeeded, at the end of some weeks, in restoring to him the use of articulate language. It is sufficient for me to say, that I first showed him how to utter the simplest articulate sounds ; that, then, I taught him how to combine sounds ; and that, after he had laboriously made some progress in these accomplishments, and especially after he had acquired some facility in combining two or three letters, his further progress was marvellous in its rapidity. I have quoted this as a case of aphemia dependent on organic cerebral disease ; and judging from the patient's history and from the accompanying symptoms, I believe it was. But I admit that the complete recovery which took place is to some extent an argument in favour of the functional nature of his disorder.

Is the chorea which has latterly appeared in my patient to be regarded as hysterical ? I do not think it has yet been proved that chorea is due to organic disease of the brain ; and we know that (although it presents remarkable relations with heart-disease, rheumatism, and scarlet fever) it is largely characterised by emotional disturbance often not unlike that met with in hysteria, and that hemianæsthesia and other symptoms not uncommon in hysteria occasionally become developed during its course. Considering how often rhythmical and convulsive movements of various kinds (some of which would certainly in former times be called chorea) attend hysteria, it would seem not unlikely that symptoms identical with those of chorea should occasionally supervene as a part of the hysterical programme. A case bearing on this subject that was under my care three years ago has recently been published by my friend Dr. Hadden in *Brain*. In substance it is as follows :—A boy fifteen years of age was on December 20th attacked with a kind of fit, attended, it was said, with faintness, sickness, and convulsions. Similar fits recurred several times during the day, and from that time choreic symptoms showed themselves. On January 16th he was

brought to the hospital, and in the casualty room he was attacked with another fit, in which he became rigid, with convulsive movements of the arms and legs; but he was conscious, emotional, and cried when questions were put to him. His mother said that before the fit came on he complained of tightness at the throat and inability to swallow. When he came to, he was received into the hospital, and was found to present characteristic general choreic symptoms with difficulty of speech. There was no cardiac disease. On Jan. 22nd he complained of a lump in the throat, jumped up, and would have fallen out of bed if he had not been caught. He rolled over on his face, sobbing. When turned over again his back became rigid and his limbs convulsed. He did not lose consciousness; he had no recurrence of fits; his chorea gradually subsided; and he was discharged well on Jan. 31st. The fits were in this case, I think, clearly hysterical; they seem to have ushered in the choreic symptoms, and they recurred from time to time during the progress of the disease. I cannot venture to assert that the chorea was in this case a phase of hysteria; but I think that this case, in association with that first narrated, and the fact of the emotional affinities between the two affections, render this view at any rate a probable one.

I now come to the paralytic state of the left internal rectus, and the peculiar condition of the muscles supplied by the left portio dura. The paralysis of the rectus was incomplete, but it was obvious, and she saw double. The left palpebral fissure was narrower than the right. The left oral angle was the more pointed, and that half of the mouth opened less widely than the other. Moreover, as I have pointed out, there was always a little twitching of this angle of the mouth, and of the muscles on the same side of the face. The condition of things was not unlike what results from an old attack of facial paralysis, in which recovery only short of perfection has taken place; the muscles regaining their voluntary power but becoming somewhat contracted and liable to flickering spasms. Mr. Nettleship was inclined to regard the narrowing of the palpebral fissure as consequent on slight ptosis. At any rate it is clear that the facial phenomena were due to affec-

tion in the domain of the third nerve and that of the portio dura.

We never got a very complete history of the case. But in the history we obtained there was nothing to show that she had ever had any acute affection of the portio dura, or that the squint and double vision were of old date. One argument against the functional origin of the phenomena is that since they were first observed they have presented no variation whatever; such as they were when she was first seen, so they remain. That hysterical patients may suffer from functional squinting I suppose there is no doubt. Within the last few days I have seen a young widow lady of twenty-five, who during the last month has for the first time in her life been suffering from the ordinary form of hysteria. But she informed me that during the previous ten years she had had paralysis, at one time of one limb, at one time of another, and loss of feeling, and that several years ago she had suffered for some months from a squint and double vision for which she was treated by an oculist. She had no headache or sickness at the time. In relation to this question, I will also refer very briefly to two interesting cases admitted under my care within a few days of one another in the winter of 1882-3.

Eliza H., a girl of nineteen, was attacked suddenly fourteen weeks before with right facial palsy, and six weeks later with weakness and numbness of the left arm and leg, the leg being affected later and less severely than the arm. She had no fit, headache, giddiness, or sickness. She had never had any serious illness before, nor had she been hysterical. On admission she was a plump and remarkably healthy-looking girl. The paralysis of the right side of the face involved mainly its lower part. She could wrinkle her forehead slightly, and could close her eye, but not firmly. The mouth was drawn over in the most remarkable way to the left side. It was almost wholly to the left of the mesial line, and the left angle was tucked up under her fat cheek so as to be scarcely visible. When she laughed, the zygomatici on the right side acted slightly. There was very slight weakness remaining in the left leg. The arm, however, was decidedly weak. There was no anæsthesia. The optic discs were normal,

and there was no evidence of disease in any other organ of the body.

Gertrude H.,¹ a girl aged fifteen, after suffering for about a week with headache and giddiness, suddenly, a month before admission, began to squint, and three weeks later began to complain of weakness, numbness, and tingling in the right arm. She, like the other, was a plump, healthy-looking girl. She had paralysis of both external recti, mainly of the left, with double vision, and impairment of sensation with marked loss of power in the right arm. She complained also of left-sided headache and some giddiness. The optic discs were healthy, and there was no sign of disease elsewhere. I may add that she, like her contemporary, presented a clean bill of health, and there was no evidence of her ever having displayed the usual symptoms of hysteria.

I need scarcely say that these two girls coming into hospital at the same time, and presenting a striking resemblance to one another in their histories and in their symptoms, attracted a good deal of clinical interest. And naturally, amongst others, the question arose whether their symptoms could be hysterical. I did not take this view of the cases; but you shall judge how far their future histories justify it. The former of these patients gradually but slowly improved. The paralysis of the arm and leg disappeared absolutely in the course of two or three months. The facial palsy made less rapid progress. It had improved by the end of three months, at which time the affected muscles presented the reactions of degeneration. She has called upon me from time to time since; and when I saw her a month or two ago, she was perfectly well, but for a trace of asymmetry in the lower part of the face. The latter patient has been under my care off and on down to the present time, and her symptoms have slowly progressed. She has suffered from variable headache, giddiness, and sickness ever since; the paralysis of the right arm and leg have become almost absolute, and hemianæsthesia of the same side has supervened; paralysis has spread to all her external ocular muscles, and complete ophthalmoplegia externa has resulted; and she has become liable to periodic epileptic

¹ See page 76.

seizures, always ushered in by two or three days of increasing high temperature. She has never had any trace of optic neuritis, and remains mentally in perfect health. I do not give the full details of this case partly because for my present purpose it is needless, and partly because I intend before long to publish it together with some other cases of the same kind. Now, were these cases hysterical? I am much more inclined than I was at first to think that this view furnishes the explanation of the former case, but I confess that I am by no means clear on the point. With respect to the latter case, I may state that I recently transferred it to another hospital, and the sister of the ward and the house-physician there settled between them to their own satisfaction that the case was hysterical, and that the girl was malingering. That she is not a malingerer I am absolutely certain. Whether the case can be regarded as hysterical depends on the limits one assigns to hysteria. I have reasons for believing that no organic changes will be found in the nervous centres after death. But the continuous progress of the case from worse to worse, and many of the special symptoms that are present, are not characteristic or even suggestive of hysteria. I do not think that these two cases are, in any sense, conclusive with respect to the question they have been adduced to illustrate; but I submit that my cases collectively point to the possibility of local paralysis being at times of functional origin, and, if of functional origin, occasionally, at any rate, hysterical.

To return to the subject of hysterical defects of speech. It is not only aphonia and aphemia which are met with in hysteria. The following case shows that we may have both stammering and aphasia. Two or three years since, a lady, thirty-two years of age, consulted me. Many things, needless to recapitulate, had conspired during the previous eight or ten years of her life to make her emotional and to induce hysteria. About two years before I saw her she had an attack of 'gastric fever.' She was ill for a long time, and when convalescent became insensible for several days, and presented symptoms somewhat like those she consulted me for. Again, three months ago, she was ill for three weeks with symptoms of the same kind. Her present attack was of a month's duration,

and was getting worse. Her condition was very peculiar. Women rarely stammer, and she was not an habitual stammerer. But now she stammered so badly that it was difficult to understand her. Her stammering moreover was odd. She began by repeating a word or two many times, then, perhaps similarly repeated one word and then the initial letter of the word, thus: 'I think, I think, I think,' then 'I, I, I,' then 'think, think, think,' and then the consonantal sound represented by *th*. Accompanying the stammering were rapidly repeated distortions of the face. These involved both sides, but were most severe on the right. The muscles of the eyelids twitched incessantly until the eyes were nearly closed. The corners of the mouth were similarly affected; and the other facial muscles, but in a less degree. The convulsive movements extended even to the muscles of the neck. She had difficulty in writing. Slowly and with deep consideration she could generally manage to translate printed words into written words. But when she tried to express her thoughts in writing she soon began to make hopeless blunders, and to repeat letters; nor could she succeed in writing her name. She could not recollect the forms of the letters she wished to use, nor could she recall their names. I tried to make her perform simple sums in addition, but she could not do it, and the figures were meaningless hieroglyphics to her. She said she could not read anything so as to understand it; that for the most part she knew the words which were actually under her eyes, but always when she reached any one word she had quite forgotten those that preceded it, and hence could not catch the meaning of even the shortest sentence. She could name anything she saw, but had great difficulty in recalling the names of things which were not present or visible. I saw her again about nine months later. I learnt then that all her symptoms had disappeared in the course of a few months, but that they had recently returned. She had had recurrence of stammering, but that was not present now. She presented, however, all the old spasmodic twitching of the facial muscles, all the old difficulty in writing, and in the recognition of letters, and all the old forgetfulness of names of things not before her. She could not recollect the name of the day or of

the month, and she told me that a few days previously she had had, as she thought, a serious and interesting conversation with a lady whom she knew, and who called upon her next day and asked her if she had not been ill, for she had talked nothing but nonsense. The patient had occasional attacks of unconsciousness, which, for anything I know to the contrary, may have been either attacks of syncope or epileptic seizures. I have no sufficient reason, however, for doubting that the case was essentially one of hysteria; and that was, I believe, the view of the medical man under whose charge she was.

2. I pass on to another group of cases. Hettie R., a girl fourteen years of age, came under my care about three years ago. Shortly before that she lost her father, and her brother died in a fit. These losses affected her deeply, and she was attacked with violent spasmodic jerkings of the muscles of the right arm and leg, and of the same side of the body, and with right hemianæsthesia. She remained in the hospital for some few weeks, and left it well, having been cured (it was thought) by the daily application of the faradic current along the spine. She continued well until four-and-twenty hours before her admission for the second time into St. Thomas's Hospital on April 14th of this year. She was now seventeen. She went out to service a week previously; found the work hard and her mistress exacting; and was attacked with a kind of fit, followed by similar jerking movements to those which she had suffered from on the first occasion. She was a healthy-looking, well-conducted, sensible girl. She had violent rhythmical spasmodic movements of the arms and legs, neck and trunk. These were most marked on the right side, and did not involve the muscles of expression or the tongue. They ceased during sleep. She had anæsthesia on the right side of the body, with impairment of smell and taste, and colour-blindness in the corresponding eye. There was slight tenderness in the ovarian regions, but chiefly in the right. Within a day or two the movements on the left side of the body subsided; but those on the right were more persistent, and though they practically ceased after a few days under the renewed use of faradism (which she begged might be em-

ployed), there were slight and trivial recurrences from time to time. Her sensory phenomena varied. At the end of a few days the right-sided anæsthesia became replaced by hyperæsthesia; a little later the anæsthesia appeared on the left side of the body; then she presented universal analgesia, and shortly afterwards the analgesia was limited to the lower extremities. It may be noticed that, during all the variations of distribution of disturbances of ordinary sensation, colour-blindness persisted in the right eye and involved that eye alone; and that during at any rate part of the time in which she was suffering from general analgesia there was general loss of feeling in the lips, gums, tongue, and inside of the mouth, with notable impairment of taste and smell. During her stay in the hospital she had several fits, lasting from a few minutes to half an hour. These began with general tremors, passing into convulsive movements of a violent kind (associated with general rigidity), and were attended during the latter part of their duration by voluble, somewhat incoherent talk, which related largely to recent events and to persons she had seen, and in which she made statements as to her relations which she would certainly not have made in her proper senses. She appeared therefore to be conscious, but she had no recollection whatever after the fits of anything that had occurred during their continuance. It may be added that the fits were sometimes preceded by globus and followed by headache, and were unattended with biting of tongue or discharge of evacuations. But lividity of surface was observed once or twice at the early period of an attack, and in one (during which the temperature was taken) this reached 100.4° . In the rigidity above referred to the back became arched, the arms extended horizontally, and the lower extremities straight, the feet being extended at the ankle-joints, and the toes flexed. The teeth were clenched. The right leg remained rigid for some hours after each attack. In this leg also at this time were observed increase of tendon reflexes and ankle-clonus. The last remaining hysterical phenomena were colour-blindness and a hitch in the action of the right leg in walking. She is now well.

There can be no doubt that this girl has been suffering

from hysteria. The emotional origin of the attacks, the shifting sensory disturbances, the rhythmical muscular contractions, the fits, the ovarian tenderness, collectively establish the truth of this diagnosis. But it is worth while to observe that there was nothing in the manner or conduct or mental state of the girl to suggest hysteria. She was bright and sensible; she had a healthy appreciation of the ludicrous, and could join in the laugh which some of her performances excited, and especially was most anxious to be cured. Indeed, as has already been stated, it was at her own request that faradism was applied; because, although the pain was dreaded by her, she had a vivid belief that she had been cured by it before. It is interesting to note that one of her fits came on at night during sleep.

My special object in quoting this case is to call attention to the mental condition of hysterical patients in connection with the convulsive attacks to which they are liable. It had generally been taught that hysterical fits were fundamentally different from epileptic fits, and that there could seldom or never be any real difficulty for a well-informed medical man to distinguish the one form of seizure from the other. It has latterly, however, been admitted that in certain aggravated forms of hysteria fits occur which partake of the special features of the paroxysmal attacks of both affections; and the term 'hystero-epilepsy' has been invented to meet the requirements of the case. The classical descriptions of epileptic fits and of hysterical fits are founded on fact; their accuracy is confirmed every day; and it will be admitted that a typical epileptic fit and a typical hysterical fit stand in essential and striking contrast with one another. But it is rather by their collective phenomena than by any one distinctive feature that they must be discriminated. Even a sudden attack of profound unconsciousness which so commonly and characteristically marks the onset of the epileptic seizure, and has been largely regarded as the test and proof of epilepsy, may be present, I think, in affections which have no true claim to be regarded as epileptic; and may certainly be absent from fits whose epileptic nature is unquestionable. Another remarkable feature of epilepsy is the tendency which many epileptics have

(sometimes previous to a convulsive seizure, sometimes in place of a fit, but more commonly in immediate succession to a fit, or rather perhaps as the later stage of it) to pass into a dreamy condition of shorter or longer duration ; in which the mind is possessed, in one case, by wild frenzy, in another case by apparently a calculating and calm resolve to carry out some atrocious design ; in which, in another case, the patient simply acts absurdly or incongruously, or even comports himself much as he would do in health ; in which the motor functions obey the mental impulses as in the normal state ; but on recovery from which the patient has either no recollection whatever of what happened during his period of mental aberration, or merely that kind of recollection which one has of a dream.

About two years ago a servant girl, seventeen years of age, came under my care. For two years she had suffered from headaches. At first they came on at long intervals, and lasted continuously for a week or two at a time. Latterly they had become more frequent and more severe, and attended with drowsiness, which made it difficult for her to perform her ordinary duties. On Easter Monday one of her attacks came on, and it continued until the following Friday, on the afternoon of which day she left her mistress's house to visit her mother, who lived four miles and a half away. She had often traversed the road before, and knew it perfectly ; but, suffering still from headache, she got confused, and lost her way. She did not reach her destination till 10 o'clock P.M. on Saturday night, when she recollects sitting down upon her mother's doorstep, where she became unconscious, and remained so until aroused by some neighbour who recognised her. She retained a vague recollection of wandering about these many hours, and of occasionally asking her way of passers-by. What was her condition during all this time ? Was she in an epileptic trance, or was her condition a phase of hysteria ? There was no history of her ever having had a fit of any kind. She was healthy-looking and free from paralysis. But she was peculiarly slow in her speech and movements. She had spots of hyperæsthesia just above both clavicles and under both mammae ; and the right ovarian region was tender. Moreover, she had marked analgesia of both arms. During

her stay in the hospital she suffered much from headache, but improved in this and other respects; the analgesia left the right arm; and the left became both analgesic and anæsthetic. There was still anæsthesia of the forearms when she left the hospital. I may add that careful inquiries were made, and left no doubt that the story the girl gave of herself was true. Collateral facts prove, I think, that the girl was hysterical, and render it pretty certain that her temporary mental confusion or obliviousness was also hysterical. But what she did is not unlike what epileptics do; of which I will quote a recent example.

A young man, a jeweller, twenty-two years old, had had fits for two years past. The first occurred just after getting out of the train on arriving at London Bridge. He came to himself nine hours and a half later, when he found himself in a cab near his own home in the suburbs of London. On getting out of the cab he was going to pay the driver, but was told that payment had already been made; and he found later that the fare had been taken out of his own purse. Another fit occurred a month ago. He was in Berwick Street, felt giddy, ran on a little way, and fell. He recollects nothing more until he found himself walking near the Great Northern Railway Station, a part of London in which he had no business. The last fit occurred near the blind asylum at St. George's Circus. He cannot recall the beginning of the fit, and recollects nothing until he awoke to consciousness some hours later, and found himself still walking somewhere about the circus. Now here, no doubt, the condition was epileptic, and the loss of consciousness, or rather the forgetfulness of what occurred to him during the attacks, was complete. There is no evidence as to what he did during the periods which were a blank to him; though on one occasion it seems pretty clear that he must have appeared so far helpless as to justify his being taken care of. But on two other occasions at least, and in one of them for a period of some hours, his behaviour must have been such as not to attract any special attention. He probably acted like the girl, and as one knows epileptics are liable to act.

In the case of Hetty R., the periods of mental aberration

which followed her fits, in which she appeared to be conscious of what was going on around her, and talked incoherently, were a blank when she came to herself. She declared, and I believe, that she had no recollection whatever of anything that happened during their continuance. One of the most remarkable examples of this kind of phenomenon in an hysterical case that I know of was published by me in the *British Medical Journal* six years ago. The case is a voluminous one, and, indeed, is still in progress; but I will quote briefly so much of it as relates to the subject I am considering. The patient was a young lady whose hysterical symptoms commenced in the year 1873. They presented many variations during the next few years. She had cataleptic attacks, in which she became plastic, and in which her arms and legs could be bent into various attitudes, wherein they would remain indefinitely; and she had violent convulsions, alternating with a strange mental condition, which, after a few months, became established, and then continued for two years without change. During this period she could move her limbs freely, and, indeed, seemed to have much muscular power, yet was unable to rise from her bed, or even to feed herself without assistance. The least exertion was usually followed by an attack of profound syncope. She could feel, but there was total insensibility to pain, and she was absolutely deaf. On the other hand, she was closely observant of all that was going on round her; was voluble in her talk, her vocabulary being peculiar; would often sing; would never take food from anyone of her immediate friends or relatives; and was vindictive, biting if she had the opportunity, and concealing sticks or knives under her pillow, and striking anyone with them if she had the chance. For a long time her doctor was the only person she cared to see, or would obey; as soon as she caught sight of him, she would tremble with pleasure and eagerness, hold out her arms to him, catch hold of his hand, and fondle it in hers, and begin to talk volubly. She would first say, 'Paws,' which meant 'Shake hands'; and if he failed to respond she would become sullen, cry, and refuse food until he did; then she would say she 'had a lot' to tell him, and would recount all that had occurred since his last visit. His visits, which were for the

purpose of feeding her, were made three or four times a day. During the whole of this time she had a strong antipathy to her father and mother and other relatives, and did not even seem to recognise them for whom they were. She knew them, however, from one another, and gave them names. One sister she called 'Dog,' another sister 'Fox,' her mother was 'that one,' and her aunt was 'the other one.' I do not think that her father had a name, but she disliked him more than all the rest; and for a long time, as her fits were disappearing (for she remained liable to them), his presence alone caused them. At the end of the two years her mother, one morning, heard her heave a deep sigh, and saw her head drop suddenly on one side on the pillow. She thought she was dying, rushed up to her, and said in alarm, 'Do you know me, Edith?' when the daughter replied 'Yes,' in a scarcely audible whisper. This was the first indication of hearing and of recognising her mother which she had manifested. She remained in this condition for a few minutes, and then suddenly passed again into her maniacal state. From this time forward she had nearly every day one of these lucid intervals. At first they lasted perhaps for about ten minutes, but gradually they increased in duration, so that at the end of six months they often persisted from half an hour to two hours. They always came on in the manner above described, and ended suddenly. They were always characterised by the same phenomena; and these, it will be observed, were in many respects the exact converse of those which marked her maniacal state. While in them she seemed to possess all her normal qualities of mind; was quiet, ladylike, and affectionate; and knew and appreciated her father, mother, and other relatives and friends. But there was utter bodily prostration; she spoke in a whisper; her eyelids were closed without the power of opening, and tremulous, though she could see when they were raised for her; and her hearing, which in her other state was absolutely lost, was now preternaturally acute. Indeed, any slight shock, and especially a sudden noise, would render her at once maniacal. On the first occasion on which her doctor saw her in a lucid interval, he conversed with her quietly; asked her to put out her tongue, which she did; and then

invited her to take food as usual, which she declined, but in a quiet ladylike way, and simply because she was not hungry. He asked her if she knew him, and she said she did not. He then tried to feed her with a spoon, when she suddenly opened her eyes, was excited as usual at his presence, and at once greeted him with 'Paws, doctor!' The lucid intervals gradually increased in duration, and at the end of another five or six months they occasionally lasted for days together; and, moreover, as they increased in length the other intervals diminished, until after a while they constituted what might be termed mad fits of a few minutes' duration only. Further, the extreme bodily prostration of her lucid periods gradually lessened; and by degrees the power of opening her eyes, of speaking aloud, and of taking food, without going off into a maniacal paroxysm, was restored. In 1877 she had recovered completely.

During the prevalence of the alternating conditions above described she appeared while in the one to know absolutely nothing of what had occurred in the other, but retained a vivid recollection of all that had happened to her in the previous periods of the same condition. Her recovery was of very short duration; and for a long time past she has been suffering from extreme contracture of one of her lower extremities, associated with occasional cataleptic attacks, lasting for several weeks at a time.

It seems to me that this girl's maniacal condition (of which she retained no recollection whatever when she was in her normal mental state) was the same in quality as the condition presented by Hettie R., after the convulsive attacks; and I repeat that I can see no real difference between their mental affection and that which is presented by many epileptics.

In reference to the relation of hysteria to epilepsy, I may just allude, in passing, to the case of a young girl, Rose D., who was three or four times under my care during the years 1881, 1882, and 1883. Her fits began when she was fourteen, a year before I first saw her. She was a plump, healthy-looking girl, suffering from fits which came on irregularly, and of which she had sometimes as many as fifteen in a day. They were generally preceded by a cry, sometimes by more

than one; were attended with loss of consciousness and convulsions; and lasted, perhaps, for about half a minute. They were certainly, I think, epileptic. In favour of which view, it may be stated, that they came on when she was asleep, as well as when she was awake; that they were generally preceded by an aura beginning in the right thigh, rising to the right side of the chest, and then involving the right arm from the fingers upwards; that she once bit her tongue in a severe fit; and that she often passed urine during an attack. But she emerged from her fits into consciousness generally with a smile on her face, and occasionally laughing. Latterly she once or twice came to herself crying. It is further stated in the notes of the case, that when she was last under treatment she more than once was laughing during an entire fit, and on one or two occasions was attacked with causeless and uncontrollable laughter, without loss of consciousness.

3. I had intended, when first the subject matter of this lecture began to take form in my mind, to devote no inconsiderable proportion of it to the discussion of hysterical anæsthesia and its relations with anæsthesia arising under other conditions. This subject, however, is too extensive to be treated of at the *fig-end* of a lecture. And I will pass on to the consideration of certain respiratory and circulatory phenomena of hysteria.¹

a. Besides aphonia, other symptoms referrible to the respiratory organs occur in cases of hysteria. I shall not enumerate them, but will briefly speak of two or three. I recollect some five-and-twenty years or more ago a nurse, aged thirty-six, was admitted into the hospital under the care of one of my senior colleagues. She was suffering, not only from aphonia, but from difficulty of breathing. Her medical attendant believed the case to be one of hysteria, but he was not absolutely sure upon that point; and as her dyspnœa increased in urgency, he judged it advisable to have tracheotomy performed. The operation was done by a surgeon (long since dead), who transixed the trachea and passed the trocar and

¹ The part of the lecture dealing with hysterical vomiting is omitted, as it was mainly an abstract of a paper which appears elsewhere in this volume.

cannula into the apex of the right pleura. Strange to say, the patient seemed to be immediately benefited; but within half an hour the right pleura had become distended with air, and difficulty of breathing of another kind had come on. She died in a couple of days from the results of the operation; and the larynx was found to be absolutely healthy. The case occurred before the invention of the laryngoscope, or the thermometer had come into use as an agent in diagnosis. Here the dyspnoea was probably due to functional affection of the larynx. In a case of my own, that of a highly hysterical girl of eighteen (who was under treatment for many months with hysterical paraplegia, attacks of hystero-epilepsy, and analgesia), dyspnoea of an asthmatic character formed one of her symptoms. This came on quite suddenly on the first occasion, and unattended with rise of temperature; but it continued for five or six weeks with varying severity, and during this period became associated with rapid breathing, frequent cough, and scanty expectoration, occasionally tinged with blood. At times, too, there was a slight rise of temperature. An attack a few months later presented similar phenomena. But rapidity of breathing may constitute the sole respiratory trouble. I recollect about ten years ago having a female patient under my care—I think between thirty and forty years of age—who, with other hysterical symptoms, suffered from attacks of rapid breathing, during which, sometimes only for a few minutes, sometimes for several hours, her respirations would rise to 70 or 80 in the minute, her pulse remaining normal in frequency, and there being no other indication whatever of intrathoracic disease. In 1883 Dr. Mackey of Birmingham published in the *Lancet* a similar case in which the respiratory acts varied between 88 and 128 in the minute, while the pulse ranged from 59 to 72, and the temperature was normal.

b. Circulatory troubles are also common in hysteria. Limited pulsations, mainly of the abdominal aorta, simulating aneurysm, have often been referred to this affection. Rapid action of the heart, tumultuous and irregular action, and extreme feebleness of action, are severally frequent consequences of emotional conditions, and necessarily, therefore,

are frequently observed in hysterical patients. I have recently seen a remarkable case of what seems to me to have been functional, not improbably hysterical, rapid action of the heart. A lady,¹ thirty years of age, three years married and without children, had a slight attack of pneumonia, from which, at the end of about five weeks, she had recovered sufficiently to be allowed to go out for a drive. This seems to have upset her, for shortly afterwards she was attacked with retching, difficulty of breathing, and nervousness. The retching subsided in the course of a day or two, but it was noticed that her pulse was remarkably rapid. It reached 180 in the minute, and as her aspect became rather livid, and she was unable to lie down, her medical attendant naturally became uneasy. When I saw her a week later she was sitting up in bed; she was spare, pale, and delicate-looking, with a shade of anxiety on her countenance, but nevertheless she was bright and cheerful, conversed pleasantly and without difficulty, and certainly did not look seriously ill. Her breath was a little quickened, but her heart was beating at the rate of 192 in the minute; the action was regular, the pulse was feeble, and the cardiac sounds, which were sharp and short, were free from murmur. The lungs were both healthy, and there was no evidence of disease in any other organ of the body. Her tongue was a little coated, and her appetite bad. This rapid action of the heart, which had existed for a week when I saw her, continued for another week, when it fell almost suddenly to 110 and then to 92. I visited her again soon afterwards, when she seemed quite well, but her pulse was still 92. The patient had always been delicate and nervous, but had never presented definite hysterical symptoms; formerly she had been stout, but some years ago became slim, and has since continued so. She never had rheumatism or any other serious disease; but during the last few years she has had several attacks like the present, and there is reason to believe that her pulse has been generally rapid. There was no protrusion of the eyeballs or enlargement of the thyroid. So far as I can call to mind, I have only on two other occasions met in adults with more rapid action of the heart than was

¹ For fuller details of this case see page 105.

presented by this lady. But the patients here referred to were dangerously ill, and their extreme rapidity of pulse occurred at times when death seemed imminent. One case was that of a young woman in whom in the course of a severe relapse of enteric fever, and when for some days her death was expected momentarily, the pulse continued at the rate of 198 in the minute. She ultimately recovered. The other case was that of a middle-aged man who had been suffering for two years from gradually increasing pallor and debility, and whom, when he came under my care, I thought to be suffering from progressive anæmia. He improved, however, considerably under treatment, and left the hospital stronger and better than he had been for many months. One day, shortly after his admission he fell, without obvious cause, into a prolonged state of collapse, and occasionally this became so extreme that his recovery was despaired of. During this attack his pulse from time to time ran up to 200. His collapse was not due to hæmorrhage.

4. At the beginning of my lecture I said I should not then attempt to define hysteria, or to fix the landmarks which separate it from other functional nervous disorders. At the close of my lecture, guided in part by the cases that have been passed in review, I return to the subject I at first dismissed. I have quoted a series of cases which I have labelled 'hysteria,' and have compared them with other cases, some of which I have regarded as not hysterical. But what right have I to make this distinction between them? Again, I ask what is hysteria?

Typical hysteria occurs, or generally appears for the first time, in persons who from sex, age, or the conditions in which they live, are specially emotional; it is attended with marked emotional disturbance, sometimes with intellectual disturbance, and is characterised by a liability to convulsive attacks, and to various affections of the sensory and motor systems, which are sometimes of general distribution, sometimes hemiplegic, sometimes paraplegic, sometimes limited to particular nerves or groups of nerves. The affection, moreover, is various in its incidence, and liable to sudden onset, sudden change, sudden recovery—circumstances which prove its independence of organic nervous disease.

But hysteria may occur with many of its characteristic symptoms highly aggravated, with many of its characteristic symptoms in complete abeyance, or indicated haply by only one or two trivial incidents. The emotional and intellectual disturbance may pass into genuine madness, as in so-called 'hysterical mania.' The convulsive attacks may resemble, if they do not merge in, those of epilepsy, as in cases of so-called 'hystero-epilepsy.' On the other hand, there may not be, and there may never have been, definite or discoverable emotional disturbance or tendency, never any convulsive attacks, never hemiplegia or paraplegia; and, indeed, the manifestations of the disease may be limited, so far as I know, to an attack of neuralgia, to painfulness and tenderness of a particular organ, to paralysis or spasm of a single muscle or group of muscles, or to some functional disorder of a single viscus.

In other words, so-called 'hysteria,' may, as it seems to me, consist in excess, diminution, or modification of all or any of the nervous functions, whether of the brain, the ganglia at the base of the brain, the medulla, the cord, the sensory or motor nerves, or the sympathetic system. And hence, by specially implicating particular parts, it may, in its symptoms, resemble more or less accurately a large number of organic diseases of the nervous system developed in the same parts. And hence also, and on similar grounds, it may resemble, more or less accurately, many other recognised functional disorders of the nervous system, which are regarded as definite diseases, and have received distinctive names, if indeed, under such circumstances, it does not become identical with them.

No doubt an emotional element preponderates in cases generally regarded as hysterical; and, for the most part, definite hysterical symptoms are the consequence either of overwhelming emotions excited in healthy minds, or of lesser emotional influences acting on minds already in a state of unstable equilibrium. But it must not be forgotten that emotional disturbance characterises, or complicates, a large number of intracranial disorders which are not of hysterical origin. It is of the very essence of insanity; in chorea, in megrim, and in epilepsy, especially in the first, the emotions are generally

implicated ; the presence of syphilitic tumours, and generally disease in the neighbourhood of the fourth ventricle, evoke a tendency to laugh and cry, and to become erotic ; and the lowness of spirits and proneness to tears which follow hæmorrhage into the brain are well known. Emotional affection is, therefore, no monopoly of hysteria. And not only so ; for while we might naturally expect emotional symptoms to preponderate when the other hysterical symptoms are such as depend on cerebral disturbance, we might as naturally expect these to be less and less pronounced in proportion as the hysterical phenomena become more and more limited to remote and less important parts of the nervous organism. And so no doubt it often is.

The view which I am inclined to hold with respect to hysteria and other functional nervous diseases, and to their mutual relationships, is as follows. There are many functional diseases of the nervous system, among which may be included insanity in many of its forms, epilepsy in its different varieties, chorea, megrim, neuralgia, and hysteria. These are all characterised by groups of symptoms referrible to excitement, depression or aberration of the nervous functions, and mainly of those of the nervous centres. They are severally distinguished clinically by the association of definite groups of symptoms ; determined either by the particular part of the nervous system affected, by the special kind of affection which takes place therein, or by the order and mutual relation of events. And we regard them as specific diseases, because experience teaches us that such groups of symptoms are so commonly observed under particular conditions as to show that specific causes must underlie them and determine their concurrence. But the causes of the different affections are for the most part closely related to one another, if not identical ; the individual symptoms which, by their modes of aggregation, constitute the several diseases as we know them are common more or less to all of them ; many cases occur in which it is difficult, if not impossible, to determine satisfactorily in which category they should be placed ; and, indeed, as it seems to me, there is no substantial line of demarcation between the diseases.

If this view be correct, the terms insanity, epilepsy, hysteria, &c., would still imply well-marked, and for the most part permanent, varieties of functional nervous diseases; but the recognition of intermediate types, or the failure to form a definite diagnosis in every case, could not be taken to imply ignorance; and it would follow that many of the limited functional disturbances of which several of my cases furnish examples have little or no claim to be called hysterical (an adjective which is usually, and perhaps conveniently, applied to them), unless the meaning of the word hysteria be so far extended as to include all functional affections for which no other name has yet been invented.

In conclusion I may venture to say, the more extensive my experience of nervous diseases has become, the more I have learnt to recognise the following facts: that many grave nervous disorders which, from their mode of onset, their symptoms, and their progress, would seem to imply the presence of organic disease, present *post mortem* no visible pathological change; that many such disorders, progressive and threatening a fatal issue, are ultimately recovered from perfectly; that limited or localised nervous phenomena, paralytic or spasmodic, anæsthetic or neuralgic, come and go without obvious cause; and that functional nervous disorders capable of cure simulate the most serious as well as the most trivial cases of organic nervous disease. It may be admitted that emotional persons, and persons of marked hysterical tendencies, are more than others liable to suffer from the affections here referred to; but some of the most remarkable examples I have met with have been in patients who, apart from their particular malady, have presented no sign or symptom whatever of the hysterical condition.

II.

*CASES OF HYSTERIA; BEING A SEQUEL TO
THE FOREGOING PAPER.*

IN republishing the foregoing lecture I have omitted one passage, but otherwise have not thought it desirable to make any, beyond mere verbal, changes in it. If, when preparing it, I had seriously thought of reprinting it at some future time in association with other papers of mine on such subjects as are therein treated of, I should certainly have replaced some parts of it by other matter. And further, if the lecture had to be given now, instead of having been given a few years ago, I should certainly introduce among its illustrations a few additional cases which have come under my observation since 1885.

I trust I may be forgiven for the few repetitions which its republication involves; and for not having ventured to disturb the continuity of my argument by the interpolation of new matter.

I propose to add the few additional illustrative cases to which I have referred in the form of a note or supplement; and, on account of their intrinsic interest, to give them in greater detail than would have been permissible in the lecture.

The first case is related to the first group of cases discussed in my lecture. It is that of a young woman who, when she came under my care, had been paralysed in the lower extremities and confined to bed for five years; who had lost her voice for two years; who for a year and a half had partially lost the use of her hands; and who was cured rapidly, first of the aphonia and then of her paralysis of arms and legs, by the use of the interrupted current. The case presented some points of special interest.

In the first place, there was exaggeration of the tendon reflexes, with ankle-clonus, which is certainly a rare accompaniment of hysterical paraplegia. In the second place, the loss of power in the arms was attended with coarse tremors when it was attempted to use them; which were so exactly like the undulatory tremors often observed in disseminated sclerosis, that, especially as they were associated with spastic paralysis of the lower extremities, they would probably have led to a misinterpretation of the case, had it not been for the co-existence of other conditions pointing unmistakably to the presence of hysteria. In the third place, by careful and repeated examination I was enabled to satisfy myself that the voicelessness in speech was due, not to any spasm or paralysis of the vocal cords, but to a want of co-ordination in the triune mechanism of speech. She could articulate perfectly, but, owing to the absence of even the breezy laryngeal sound which is the basis of whispered speech, and to the extreme feebleness of the current of air emitted from her chest while she was articulating, her words were almost inaudible. She could bring her vocal cords into absolute apposition; and therefore, had she breathed with sufficient force through the chink of the glottis at the time when it was thus closed, she could not have helped phonating; and in fact she did phonate when she coughed; and, as shown in the narrative of the case, she could, with an effort, twitter in a high falsetto, and could also utter curiously coarse unmusical notes. But she was quite unable to phonate and articulate at the same time. In the same way, the expiratory blast from the lungs which wakes the music of the larynx, and upon which articulation is moulded, though quite under her control for the purposes of respiration, could evidently not be adapted to the requirements of speech. For when she spoke there was practically no expiration going on; and although, as I have shown, she could phonate in a special and unnatural way, she practically yielded no laryngeal sound whatever, even though her vocal cords were closed, when she tried to phonate naturally. In the last place the case is noteworthy as demonstrating the great value of faradism in the treatment of aggravated and long-protracted hysterical states.

CASE 1.—*Paraplegia of five years', aphonia of two years', and paralysis of the arms of eighteen months' duration, rapidly cured by the faradic current.*

Harriet P., unmarried, 25 years of age, came under my care on November 18, 1887.

After various hysterical symptoms, occurring from time to time during a period of ten years or so, she became paraplegic five years ago, and has been confined to her bed ever since. About three years ago she began to lose her voice occasionally; a year later she lost it altogether, and thenceforth has remained aphonic. Eighteen months ago weakness of the arms came on, and she has been quite unable to feed herself from that time to the present.

On Admission.—She is a pale, short, plump girl, with profuse black hair. She lies helpless and contorted, viewing her surroundings through half-closed eyelids; but she preserves a certain sense of humour, and is quite ready to join in a laugh against herself in a feeble, irresolute kind of way.

She declares that she has lost her voice, and has to make herself understood by whispering; but when urged to make an effort, she shows her power to phonate by uttering inarticulate sounds, sometimes high-pitched and squeaking, sometimes low and absurdly gruff, and when told to sing she twitters.

Her arms lie flexed upon her chest, and a feeble lifting of the hands represents the amount of her voluntary power over them. When she attempts to bring either hand to her face, especially if she is holding something in it, the limb becomes violently tremulous, as one sees in typical cases of disseminated sclerosis.

Her legs are weak; so that, although she can move them feebly at the larger joints, she is quite unable to stand. There is a general tendency to rigidity in them, and the feet are extended at the ankles.

Knee-jerks brisk; ankle and patellar cloni obtainable; plantar reflexes absent; abdominal reflexes well-marked.

No impairment of sensation anywhere in the body. No affection of any of the organs of special sense, or of the muscles of the eyes, tongue, or mouth.

The thoracic and abdominal organs are quite healthy; but she has some tenderness under the clavicles and about the umbilicus, none in the ovarian regions. She complains of pain in the left side of the trunk.

Dr. Semon examined the patient's larynx, and reported that its

movements were perfectly normal, and that there was complete closure of the glottis on attempted phonation. *

Further observation confirmed all the statements with respect to her condition made in the above paragraphs. The character of her defective speech was further investigated. She could articulate perfectly, but when speaking she expired with so little force, or not at all, that she spoke in an almost inaudible whisper. She could phonate as above described, and in an extremely high key (a weak falsetto) she could twitter tunes with perfect accuracy. But she was altogether unable to combine phonation with words; and on several occasions when we got her to articulate while singing, the combined literal sounds seemed to have no relation whatever to anything she was trying to sing, and were, in fact, mere unintelligible gabble. The weakness, more especially in the upper part of the arms, and the tremors when the arms were in use, and the loss of power with rigidity in the lower limbs, and excess of tendon-reflex and ankle-clonus, were persistent.

On the morning of the 20th the interrupted galvanic current was applied on either side of the larynx externally, with the effect of causing her to make a variety of laryngeal sounds, varying from bass to treble. This treatment was repeated daily, and on December 3, for the first time, she combined, under its influence, phonation and articulation, and repeated the first part of the alphabet in a natural voice. On the 5th, also while under the influence of the battery, she spoke and read aloud fluently.

From this date the battery was also applied daily to the arms and legs, and rapid improvement took place in them. On the 9th it was noticed that she retained complete power of normal articulation and phonation; that her arms, which a few days previously could not be lifted from the bed, and had been in this state and quite useless for many months, could be employed with perfect freedom and with scarcely a trace of tremor, and that she could now feed herself; and that there was considerable improvement in her power over her legs, although she could still neither stand nor walk. Ankle-clonus was not now obtainable; the plantar reflexes were still absent.

The improvement continued progressive, and by December 20 she could walk round the ward without assistance, though her gait was constrained and her back much bent. She attributed her stoop to pain and weakness in the back and left side. Ankle-clonus was again present.

Subsequently to the last date, the restored powers were all

maintained; she continued able to speak and sing naturally, she entirely lost the tremors in her arms, and was able to employ these limbs for all purposes; she lost in great measure her stooping gait and her sense of pain; and she was able to take exercise freely.

On the evening of January 7 the usual Christmas entertainment was held in the ward, and my patient contributed to the amusements of the occasion by singing, in a good voice, with spirit and in tune, 'Won't you buy my pretty flowers,' the chorus being joined in by the other patients. The effect of this excitement was that the next evening she lost her voice, and for some hours afterwards spoke either in an unnatural gruff tone, or (when found fault with) in falsetto.

No other drawback, excepting an accidental attack of tonsillitis, occurred. She at times complained of pain in her back and side, and had a tendency to stoop when standing or walking; but she retained her power of audible speech, and the perfect use of her arms and legs. She was sent to a convalescent home on February 22, 1888.

She was treated to the last with the daily application of the interrupted current, and latterly with shower baths. Massage also was occasionally employed.

While at the home she lost her voice on one or two occasions, and, at the end of her month, returned for a few days to St. Thomas's before going to her home in the country. While in the hospital for the second time she appeared to be quite well.

The second case furnishes an interesting illustration of the mental phenomena which are discussed under the second head of my lecture: phenomena which attend both certain cases of masked epilepsy and certain cases of hysteria.

The patient was a girl of nine who had suffered, off and on for a year, from a peculiar hysterical condition, coming on at a particular time every day, and lasting for an hour or two. In the attack she seemed to be mentally unconscious of what was going on outside her; but she displayed a remarkable memory of the incidents of the earlier part of the day, and of the conversations she had heard, which she repeated in a somewhat fragmentary form, (and interspersed with snatches of songs) volubly, and so accurately that we gave her the name of the living phonograph. The case, so far as the mental phenomena were concerned, is much like that of Hetty R., and has also some resemblance to that of the young lady quoted later in

my lecture, in which were observed alternate mental phases, each series of which constituted, so to speak, a separate intellectual life.

CASE 2.—Periodical fits, during which the patient repeated with volubility the conversations she had heard during the intervals.

Alice S., aged 9, came under my care on February 3, 1887. She had had good health until the previous May, when she became liable to peculiar attacks, or fits, coming on every evening and lasting for about two hours. These began with a kind of swoon, and were characterised by spasmodic movements, mainly of the left side, and constant nonsensical chattering. She recovered after three months, and continued well until last Christmas, when she was again attacked with fits like those she had suffered from previously, excepting that they were unattended with convulsive movements. Since then she has had a fit of the same kind every evening at five o'clock, lasting as before for about a couple of hours. The constant chattering which went on during the fits consisted mainly in repeating scraps of discourses she had overheard or taken part in during the day, volubly and apparently with great accuracy. On emerging from her attacks she had no apparent knowledge of what had taken place in them; and it may be added that in her healthy state she had no special gift of mimicry or of such ready memory as she revealed in her morbid phase. It did not appear that she had ever been overworked, or shown other signs of hysteria; but her mother had latterly been in the habit of getting everything ready for the coming fits before they were due.

When seen at 5.30, on the day of admission, she was in one of her fits. She was lying on her back with her eyes closed, the eyelids occasionally quivering, the arms flexed and rigid and the hands clenched, and the legs also rigid. She was talking loudly and rapidly, but not shouting, with occasional pauses. Her words were evidently reproductions of what she had heard or might have heard during the day, as between her mother and Dr. Mackenzie, between two mothers concerning their babies, between several schoolmates, &c. She also sang snatches of songs, beating time with her right leg. She paid no attention to what was said to her, and did not adopt any suggestions made in her presence (such as of a fire or a scene in the snow). But she resisted any attempt to open her eyes forcibly, and pricking with a pin excited purposive movements, and after a short time crying. Corneal and other superficial and tendon reflexes were present. Tickling the soles of the

feet excited at first tonic flexion of the toes, then movements to escape tickling, and then a burst of tears and the remark 'I have had enough,' on which she at once came to herself. She then appeared to be quite well, and said she had no recollection of what had happened.

She was a healthy-looking child, quite bright and intelligent. There was no optic neuritis, no affection of sensation or paralysis, and no evidence of visceral disease.

On the evening of the day after admission she had another similar attack, in which again she chatted volubly and sang, her talk as before being a repetition in the main, if not wholly, of conversations she had heard during the day.

After the second fit she was threatened with the cold douche if she should have any subsequent attack. This threat broke the spell, for, although she remained in the hospital until March 14, there was no further recurrence; and she seemed to be in all respects, mentally and bodily, a perfectly healthy and well-conducted child.

The third case throws light, I think, on one quoted in subsection (*a*) of the third division of my lecture. The case to which I allude is that of a nurse who suffered from difficulty of breathing, which her medical attendant, Dr. T. A. Barker, regarded as hysterical, but which was so persistent and alarming that he thought it right that tracheotomy should be performed. This was before the laryngoscope had been invented, or the varieties of paralytic and spasmodic affections to which the vocal cords are liable had been studied; and the actual state of things therefore did not permit of accurate diagnosis. I did not see Dr. Barker's patient during life; and the brief clinical notes which I have given were obtained by me after her death, from those who were in attendance on her. I make these remarks because the notes state that she was suffering from aphonia as well as from dyspnoea; and I think it not improbable that the word aphonia was used loosely of mere difficulty of speech from shortness of breath instead of aphonia in the true sense of the word. At any rate it strikes me now that hysterical dyspnoea threatening to prove fatal is much more likely to have been due, as it was in the case I am about to quote, to spasm of the adductors (which does not cause aphonia) than to any other form of spasm or paralysis.

The case is that of a young girl who became my patient on account of inspiratory dyspnoea and stridor, caused by spasm of the adductors coming on during inspiration. She had had three previous attacks of the same kind. Every attack began with sudden faintness, followed by vomiting, which was replaced at the end of a few days by her respiratory trouble. The spasm of the cords varied in severity from time to time; ceased during sleep; and at one time was so severe that the performance of tracheotomy was seriously entertained. She was cured by the local application of the continuous galvanic current.

She also presented, while under treatment, loss of taste, and anæsthesia distributed in variable areas over different parts of her trunk and limbs, recovery from which followed almost immediately on the cure of the laryngeal spasm.

It may be observed that her dyspnoea accurately resembled, in its clinical features, the dyspnoea of paralysis of the abductors dependent on organic disease, excepting in the important fact that it ceased during sleep instead of undergoing aggravation at that time. Her sleep was quite noiseless.

CASE 3.—Functional inspiratory dyspnoea and stridor, with loss of taste and anæsthesia. Recovery.

Emily L., aged 16, was admitted under my care on January 14, 1888. For the most part she had enjoyed good health, but stated that for the last three years she had been liable to a 'croupy' cough, and that for some time she had been working in a place where a feeble-minded young man, liable to epileptic fits, was employed, and had frightened her. She had never had hysterical fits. The catamenia had been irregular for three months.

The malady, for which she became a patient, first showed itself in the previous June. It came on suddenly, and left her at the end of two or three weeks. A second attack occurred at the end of August, and ran the same course as the first. Her third commenced on November 11, and continued for a week or two. She was then under Dr. de Havilland Hall's care at the Westminster Hospital. Her last (the present) attack began on January 8, six days before admission.

All four of her attacks came on suddenly, and apparently causelessly, with faintness of a few minutes' duration, followed by sick-

ness. In every instance the sickness, determined largely by the taking of food, continued for four or five days, and was then replaced by noise and difficulty in breathing, which disappeared when she was asleep, and was unattended with impairment of voice. On the present occasion the dyspnœa had come on two days before admission.

Present State.—She is somewhat pale, but plump and well-grown. She suffers from inspiratory dyspnœa and stridor. No noise or difficulty attends expiration, and her voice is not affected. There is no dysphagia, and the back of the throat is of healthy appearance. The thoracic and abdominal organs are all healthy, but there is some tenderness in the left ovarian region. No anæsthesia can be discovered, nor is there any paralytic or other phenomenon (save only the conditions previously described) pointing to the presence of nervous disorder. The *alæ nasi* expand with each inspiration.

The above symptoms were continuous during the day, and disappeared during sleep. Within a day or two after admission, her larynx was examined by Dr. Semon, who reported as follows: 'Perverse action of the vocal cords, that is, the cords are adducted instead of being abducted during inspiration, and separate during expiration. When the laryngoscope is applied for any length of time, the inspiratory closure becomes intensified, and the phases of expiratory separation become shorter and shorter both in extent and in duration, until finally, during both inspiration and expiration, the glottis remains firmly closed, and asphyxia appears to be imminent. The spasm is released as soon as the laryngoscope is removed.'

The inspiratory stridor, though varying somewhat in severity, and usually becoming aggravated under excitement or after the use of the laryngoscope, never disappeared absolutely while the patient was awake.

On January 23 it was accidentally discovered that there was an area of anæsthesia on the front of the neck. This was well-defined, triangular in shape, bounded on either side by the anterior edge of the sterno-mastoid, and above by a horizontal line about the level of the hyoid bone. Its apex was an inch above the sternum. In this area she could not feel the prick of a pin, or the battery when less than twenty cells were employed.

On the 27th it was noted that her dyspnœa had continued without material change, that she had suffered from headache and low spirits, that the patch of anæsthesia persisted, and, further, that she had anæsthesia in the anterior two-thirds of the tongue, and loss

of taste in the left half of this organ, and of smell in the left nostril. It was observed also that the patellar tendon reflexes were brisk, the plantar reflexes feeble or absent.

There was no appreciable change in her condition from this time to February 11; when it was discovered that, in addition to the anæsthetic areas above noted, she had patches of anæsthesia, chiefly on the left side, in the infra-clavicular and scapular regions, and over the shin, and some degree of hyperæsthesia on the right side. The knee reflexes were normal, the plantar rather brisk.

She continued in much the same state for the next three weeks. Now and then there was a little diminution of dyspnœa, and now and then a little restoration of taste, and on one occasion she presented inspiratory dyspnœa while she was sleeping. On March 4 it was remarked that her breathing was better, that there was no stridor while she was breathing without effort, and that her cutaneous anæsthesia remained unchanged, but that for the last three days she had lost taste absolutely, so that she could recognise neither sugar, salt, nor mustard.

Subsequently it was ascertained that the patient had blunted sensibility over nearly the whole of the arms and head and neck, and absolute anæsthesia of the entire scalp, of the left hand and extensor aspect of the left arm, and, as before, of the front of the neck and of the tongue, so that she was still without taste.

On March 12 a careful examination of the distribution of the anæsthesia was made. At that time the loss of feeling had increased and extended. There was complete anæsthesia over the entire body and limbs, excepting in the left clavicular region, both loins, the lower part of the abdomen, the thighs, and small scattered areas over the soles of the feet and the toes. For some few days the inspiratory stridor and dyspnœa had been getting seriously worse; she had been breathing rapidly (48 in the minute) with much sense of distress, and presenting slight duskiness of aspect. And, in fact, her symptoms had been at times so severe that arrangements had been made for the performance of tracheotomy in case of emergency. On the evening of the same day her breathing became worse than it had yet been, and she was unable to lie down. The question of tracheotomy was now seriously entertained by the resident officers, but before resorting to that measure it was determined to apply galvanism locally. The constant current (15 to 25 cells) was employed, a pole being applied on either side of the larynx, just above the sternal end of the clavicle. The immediate effect was that the breath was held for a long time, and then there was a deep inspiration, after which the patient took at least five and twenty successive

noiseless full inspirations. She cried a good deal, and when the crying ceased her breathing continued fairly easy.

The constant current (25 cells) was afterwards applied every morning to the neck for a period of two or three minutes. The immediate effects were that the patient became emotional, and that after this condition had passed off, her breathing was greatly improved. For a day or two she still had stridor at times, and her anæsthesia underwent little if any improvement, although it varied somewhat in its completeness and extent.

On March 16 it was remarked that she had had no stridor or dyspnœa since the previous day, and that her breathing was entirely natural. And thenceforward there was no recurrence whatever of her inspiratory trouble. On that day also she discovered that she had some return of taste, and she could just feel that something touched her when she was pricked with a pin on the tip of the tongue, or on any part of the scalp. The only absolutely anæsthetic part was the area in front of the neck. The next day (the 17th) she could feel everywhere, and her taste was restored; and she left the hospital at her own request, on the 18th, quite well.

She came to see me as an out-patient several times after her discharge, and remained in good health to the last.

During her stay in the hospital the patient was treated with tonics and shower-baths, and galvanism was applied at times to her throat, and for some days (at Dr. Semon's special desire) over the phonatory centres of the brain. But no real benefit resulted from any of these items of treatment. Indeed, no substantial improvement took place until the application of the powerful continuous current to the larynx a week before she left the hospital. The effects of this treatment were immediate and striking, although she did not recover permanently from her dyspnœa until the galvanism had been repeated two or three times. It is interesting to note that upon the cure of her respiratory trouble followed (without special treatment) the cure of the loss of taste and widely-distributed anæsthesia.

III.

ON THE FUNCTIONAL VOMITING OF
HYSTERIA.¹

THERE are few more troublesome affections to deal with than hysterical vomiting, and I suppose that most practitioners of long experience have, at one time or other, been sorely perplexed by cases of the kind. Fortunately, patients seldom die of it, and, even though all kinds of treatment may seem to fail, more or less perfect recovery usually ensues in the long run. I call to mind a few cases which in former years have deeply interested me; especially two—the one, that of a young unmarried woman, a hospital patient, the other that of a lady of mature years, whose hysterical symptoms were induced in the first instance by severe domestic affliction. The younger patient's vomiting dated from a voyage she had made across the Atlantic some time previously to her admission into the hospital. She continued to vomit after everything she swallowed, and came under my care in a state of great debility and emaciation. She remained in the hospital for some time, suffering from what seemed extreme irritability of the stomach, which drugs failed to influence, and which was finally benefited, though not cured, by reducing the food administered by the mouth to spoonfuls of milk only, and by supplementing these by nutrient enemata. The lady presented many symptoms of aggravated hysteria, besides constant and uncontrollable vomiting coming on immediately after everything that was taken into the stomach. She continued in this state for two or three years, became reduced to the last stage of emaciation and helplessness, and on many occasions appeared to be at the point of death; but she recovered. Some years

¹ *Practitioner*, March 1883.

afterwards, having in the interval enjoyed excellent health, she suffered from a recurrence of her malady. In many respects the symptoms were different, but there was a return of the incessant vomiting. She continued in this state for many months, and again she became a living skeleton, and again her life was despaired of. But once more she recovered absolutely; and she remains well. I do not give these cases in detail, because they throw no clear light on the special subject of my present paper.

In the spring of last year another case of aggravated hysterical vomiting came into the hospital under my care. The patient was a distinctly hysterical young girl who had been constantly vomiting for about four months, and who had consequently become extremely thin and weak. The abdomen was shrunken, but there was no sign of abdominal disease. Nevertheless, she continued to vomit after admission, exactly as she had vomited before, after everything she swallowed, even if it were only a little water. Various remedies were tried without effect; the food was reduced to milk given in diminishing doses, and ultimately in teaspoonfuls, but still she vomited. Raw meat was then administered, but the result was the same. Then for a week or so nutrient enemata were given, to the exclusion of all other food; at the end of which time milk was again tried in minute quantities, and again it was rejected as it had been all along.

The question now for the first time presented itself to my mind, 'Was it possible that the girl's vomiting was due, not to irritability of the stomach, but to functional affection of the œsophagus, and that she was being slowly starved simply because no food ever reached the stomach?' There was no doubt whatever that she swallowed the food. On this point the ward-sister and all who had to deal with her were unanimous. Indeed, I had myself watched her in the act of taking food; and further, I now made her swallow some milk in my presence. The act of deglutition was—it always had been—perfectly performed, the mouthful descended into the œsophagus, and thus got out of the sphere of voluntary action; and then, at the end of a minute or two, after appearing to suffer from a great deal of discomfort she brought it up, as

was her custom, without violent straining, but with efforts that fairly well resembled those of vomiting.

The reasons which collectively led me to suspect that her food never reached her stomach were partly personal reasons, and partly reasons derived from experience.

The personal reasons were, that there were never any clear symptoms of indigestion, no uneasiness after food, no flatulent distension or tendency to eructate, and that, so far as I could ascertain, she vomited all kinds of food, liquid or solid equally, no matter how little or how much was taken. It seemed impossible that she could vomit from the stomach, without the most violent efforts, the minute proportions of milk, iced water, and raw beef which were often administered to her, which nevertheless she did reject (after swallowing) almost without change and almost without effort.

The reasons derived from experience were mainly furnished by three cases which presented themselves to my mind. A spare, middle-aged clergyman, of nervous temperament, and liable to megrim, has been in the habit for several years past of consulting me about his ailments, of which the most important is a peculiar spasmodic affection of the œsophagus (so far as I know quite independent of organic disease of the part), which is apt to attack him at the beginning of a meal, and is usually attended with a painful sense of constriction, originating in the lower part of the tube, gasping for breath, and faintness. Now, and then, also, he brings up during the night a quantity of mucus, which appears to come from the œsophagus. But the special point in his case, which makes me refer to it now, is that some time since he took at night a dose of morphia for the relief of a threatened attack of megrim without the expected relief, or even sleep, following, until half an hour or so after breakfast next morning, when he became drowsy. He was satisfied that the morphia had lain in his gullet all night, and that it had only been carried into his stomach with his breakfast. His suspicion has since been confirmed; for on several occasions subsequently, his dose of morphia, if it has not been carried on by food taken later, has lain in his œsophagus all night without producing any effect; and either it has been regurgitated in the morning, or its effects have followed his matutinal repast.

The second case was that of a hospital patient of mine, a man over fifty, who had suddenly, about a week before admission, become incapable of swallowing. He had been a healthy man; there was no explanation of his state that I could make out; but he had been wholly without food for a week, and he had consequently become thin, and especially much enfeebled. On making him take food in my presence, I found that he masticated properly, and that the act of deglutition was performed without difficulty, but that immediately what he had taken was violently ejected. The impediment was clearly in the upper part of the œsophagus. Having failed to detect any lesion by external examination, or by looking down the throat, I proceeded to pass a bougie. There was a very slight impediment at the upper part of the œsophagus, which was overcome without difficulty, and the instrument was pushed on into the stomach. The effect was marvellous; the patient swallowed without the slightest difficulty immediately afterwards, and swallowed thenceforth as readily as he had always done up to the time of his illness. He came under my care again six months later for a temporary attack of catarrhal jaundice, of which he recovered in the course of a week or ten days. He had had no recurrence of dysphagia.

The third case was one of painful interest to me, for I failed to recognise its nature, and it is mainly, perhaps solely, to this failure, that its fatal issue must be attributed. The patient was a young man, whose illness had commenced six months before I took charge of him, and was attributed by him to his having drunk a pint of beer, which irritated his gullet as it passed down. From that time he seems to have had constant sickness after food, and to have vomited from five minutes to half an hour after everything he took. He was very thin and weak when I first saw him, but I was unable to detect any evidence of abdominal disease. I attached very little importance, however, to the attributed origin of his illness, and assumed that, as his vomiting was often (indeed generally) delayed for some considerable time after the ingestion of food, it was due either to pyloric obstruction, or to some functional disturbance of the stomach referrible to disease external to it. In other words, though I never ventured to commit myself as to the exact nature of his

malady, I believed that he had organic disease—either chronic ulcer or cancer of the stomach, or disseminated peritoneal cancer or tubercle. There were obvious and strong reasons against each of these views of his case; still, believing as I did that the vomited matters came from the stomach, I did not see my way to any other explanation, and I never thought of passing a bougie or of feeding him by the œsophagus-tube. His vomiting was persistent up to the time of his death. At the post-mortem examination his stomach and other abdominal organs were all found to be healthy, and the only lesion discovered was dilatation of the œsophagus with hypertrophy of its walls. I now naturally attached more importance than I had done to the history which he gave of his illness; I admitted that his dilated and flaccid œsophagus had formed a virtual impediment to the entrance of food into the stomach; I became impressed with the important practical fact that, in œsophageal obstruction, vomiting may be delayed for half an hour or more, as it is habitually in pyloric stricture; and, above all things, my unfortunate experience taught me the importance, in all obscure cases of persistent vomiting, of not omitting to examine the œsophagus, or to try the effects of injecting food directly into the stomach. The following are the details of this case:—

*CASE 1.—Dilatation of the œsophagus with persistent vomiting.
Death.*

J. B., a gardener's labourer, aged 24, was admitted into St. Thomas's, under my care, on June 7, 1879.

He had been perfectly well (he said) until six months previously, when one day he drank about a pint of beer, which had a bad taste, caused some irritation along the gullet, and made him sick. The next day he had pain and difficulty in swallowing, and vomited after every meal. The vomiting had continued ever since, coming on from five minutes to half an hour or even an hour after ingestion, and induced not only by food, but by iced water and by medicine. He thought, however, that solids had been less provocative of sickness than fluids. He had at no time, since the very first, had pain or difficulty in the act of deglutition, but had often suffered more or less pain behind the sternum and extending to the umbilicus, coming on after food and relieved by vomiting. He had never vomited

blood. He had generally had a desire for food, and had suffered only slightly from thirst. The bowels had been much confined. He had had a slight cough on and off for some time, and said that his sputa had occasionally been streaked with blood. He had lost flesh and strength latterly.

He was a thin, delicate-looking man, and patches of dilated vessels in his cheeks added to the unhealthiness of his aspect. His tongue was clean and moist, but rough, his appetite was fair, his bowels constipated. He complained of a slight dry cough; but on physical examination there was no evidence of disease either of the lungs or of the heart. The respirations were 18, and the pulse 120, feeble, small, and regular. The abdomen was soft and flat, and no tumour or enlargement of any organ or tenderness was discovered in it. The urine was small in quantity, free from albumen, and its specific gravity was 1028. The temperature was subnormal. There was no œdema of the limbs, and no enlarged glands in any accessible region. The vomit consisted mainly of matters which had been swallowed, and presented no pathological products under the microscope. The motions were solid and of a healthy character. He was treated with bismuth and put on milk diet.

It would be tedious, nor would it be instructive, to reproduce the periodical notes that were taken of the patient's case from the time of his admission up to August 25, the day of his death: for, beyond the fact that there were progressive asthenia and emaciation, the symptoms varied but little from week to week.

He was treated dietetically mainly with milk, and latterly with wine in addition, given in small quantities by the mouth at frequent intervals, and with nutrient enemata administered from two to four times a day. This treatment had the effect apparently of diminishing his sickness from time to time, and even of arresting it occasionally for a day or two; but on the whole the vomiting continued generally after everything he took, coming on from five minutes to half an hour or so afterwards, and at times was severe. The vomit was generally merely what he had swallowed mixed with mucus; but occasionally it was dark and offensive, and had an unpleasant taste. Streaks of blood were observed in it from time to time. He generally complained of pain behind the sternum after swallowing, and occasionally also of pain at the episternal notch, a few inches below the left nipple, or at the umbilicus. It was noted on one or two occasions that the vomit came up without any straining. And, during the earlier part of his residence in hospital, he manifested a desire for food. He complained but little of thirst. His tongue was generally coated and sometimes dry.

The abdomen never became tumid. On the contrary it got more and more hollow, and was always free from tenderness and evidence of tumours. Shortly before his death it was remarked that what appeared to be a narrow, thick-walled tube could be felt extending transversely across the abdomen above the umbilicus, and could be freely moved upwards and downwards. It was assumed to be the contracted stomach.

The bowels for the most part were confined, but during the latter part of July the patient suffered from diarrhoea.

The daily yield of urine varied from 10 to 18 ounces. Its specific gravity was high, but it was free from albumen and other abnormal matters. At one time he complained of pain, and difficulty in passing it.

He suffered more or less from cough during the whole of the time he was under observation; and at times it was very troublesome and attended with mucous expectoration, which was occasionally streaked with blood. There was never any clear evidence of pulmonary phthisis, but respiration was harsher and the vocal resonance louder at the right than at the left apex, and some variable crepitation and rhonchus were observed here and there.

The heart's action was very feeble, and the pulse, which was always small and regular, sank until latterly it was only 52 in the minute.

His temperature never rose above 98.7° , and was almost invariably subnormal. It tended also to sink from the time of his admission to the day of his death. During July it ranged for the most part between 97° and 94° in the axilla. In August it sank still lower, and before his death fell to 92.8° . Latterly also he complained much of cold, and his hands and feet became cold and livid; occasionally he perspired. There was a uniform loss of body-weight from first to last. He weighed 8 stone 3 pounds when he first came into the hospital. He weighed only 5 stone 9 pounds on August 16. He was often very low-spirited during his illness, and was apt to cry; and shortly before his death he was occasionally delirious. He was conscious, however, to the last.

Autopsy.—The œsophagus was much dilated throughout its whole length, and full of fluid. It measured five inches in circumference at its upper part, and three inches just above the cardia. There was no stricture. The muscular coat was hypertrophied. The mucous membrane was thickened, generally pale, but presenting a few injected vessels, and thickly studded throughout its whole length with shallow circular pits, which appeared to correspond to dilated mucous follicles.

The stomach was much contracted, and its mucous membrane presented a few patches of congestion. The intestines were contracted and healthy. All the other abdominal viscera and the peritoneum were free from disease.

The lungs were congested, and the base of the right one was collapsed. Otherwise they were healthy. Heart healthy.

The lessons applicable to my hysterical patient, which these three cases taught, were that vomiting from the œsophagus might simulate vomiting from the stomach; that œsophageal spasm or weakness might form a persistent obstacle to the passage of food; that small quantities of alimentary or other matters might fail to excite the proper peristaltic movements of even the healthy gullet; and that hence the feeding of patients with teaspoonfuls of food, as is done in cases of irritable stomach, might fail both to impart nourishment and to throw any light on the condition of the patient's stomach.

The results of my experiment will appear in the narrative which I now proceed to give.

CASE 2.—*Hysterical vomiting. Cure.*¹

A delicate-looking girl, 14 years of age, was received into one of my beds in St. Thomas's on September 21, 1881. She was suffering, we were told, from an hysterical affection of the right hip, which first showed itself in July, 1879, and which had continued, without cessation but with varying severity, up to the date of her admission. It did not appear that she had ever before suffered from any serious illness; she had never had fits; she had never been hysterical (in the popular sense of the term); the catamenia had not appeared.

At the time mentioned she fell into a state of languor and weakness, and the right hip became very painful—the pain running down the front of the thigh, and extending into the knee. The pain increased in severity until October, at which time she limped in walking, and only put her toes to the ground. This condition continued without change to the end of the year, when some improvement took place, which was maintained during the greater part of 1880. In the autumn of that year her symptoms became

¹ An almost identical case of œsophageal spasm, only in a young boy, is recorded by Mr. Hulke. *Clinical Soc. Trans.* vol. vi.

much aggravated; she seems to have had considerable lumbar pain, and is said to have had sciatica. She then took to her bed, and never left it till July, 1881. There was no improvement, however, after this time, and she was at about her worst when I first saw her.

Then she complained of some pain in the back, but mainly she suffered with her hip. The joint was slightly flexed, and when she attempted to walk (which she did unwillingly and only with assistance) the right lower limb was kept bent at the hip- and knee-joints, and she limped, but she planted her foot flat upon the ground. The hip was excessively tender, especially behind the greater trochanter, but there was no swelling, redness, or increase of temperature, and it was distinctly observed that she complained no more when the joint-surfaces were pressed against one another, or when the ligaments were stretched, than she did when the skin was simply touched. There was some rigidity about the joint, but no wasting of muscles. There was nowhere any loss of sensation or of the tendon reflexes, but the superficial reflexes were feeble. The affection had been regarded as hysterical, prior to admission, and in this opinion I and others who saw her in the hospital concurred. While under treatment she manifested a tendency to sob at times, and the condition of her hip varied a good deal, but she left, apparently much improved, on December 10.

She was re-admitted on May 15, 1882. It appeared that, soon after she left the hospital, she began to vomit after food, and before long, after everything she took, the sickness coming on immediately; that she rapidly lost flesh and strength; and that, although the hip-affection remained, it formed a less prominent subject of complaint than it had done previously.

She was much emaciated (weighing only 3 stone 3½ pounds), very feeble, and confined to bed; her cheeks were a little flushed, and her face (which rarely varied) wore a mixed expression of apathy and martyr-like resignation; her skin was dry; her pulse feeble and slow; her temperature normal. She vomited after everything she took; her bowels were constipated; her urinary secretion was normal; she had no abdominal pain. The belly was hollow, and presented neither tenderness nor lump. The catamenia had not appeared. Her hip was tender, and the joint was kept partly flexed; but she complained of it much less than when she was in the hospital last.

From the first she continued to vomit in the same manner; the vomit consisting mainly of the food swallowed and mucus, and the sickness generally coming on a few minutes after ingestion. It was sometimes, however, delayed for ten minutes or a quarter of

an hour. It appeared, nevertheless, that a small proportion of her food was retained. After a day or two's experience she was ordered to take a dessertspoonful only of milk every half-hour, which she vomited. The quantity was then reduced to a teaspoonful, which she likewise vomited; but at the same time nutrient enemata were directed to be administered twice daily. As the vomiting continued without abatement after every kind of fluid swallowed, no matter what its bulk, it was determined to make trial of small quantities of solid food, frequently given. Pounded raw beef, mixed with currant-jelly, was selected, of which she took a teaspoonful at a time. This, however, returned, as everything else had returned. A fortnight after admission (the rejection of food continuing unabated) it was determined for a few days to give the stomach entire rest, and to feed her solely with nutrient enemata, of which at first three and subsequently five were given daily. She was treated thus for about ten days, and during this time vomited only after taking medicine, which was consequently discontinued after a day or two. During the latter period no particular change was observed in her condition; she presented the same manner and appearance as on admission; she complained of no pain excepting in her back and right hip; she was generally very restless and sleepless at night; she had no desire for food or drink; she did not feel sick; her bowels were confined; her temperature was generally subnormal, as it had been nearly ever since admission, and often sank to 96° ; her pulse, which was extremely feeble, ranged between 42 and 60. She had lost only one pound in weight in a little more than three weeks.

At the end of this time the administration of milk in teaspoonful doses was recommenced—at first only three or four times a day, and then every hour. But again I was disappointed; for after every dose of milk, milk was speedily vomited. In fact her stomach appeared to be just as irritable now as it had been at first. After a day or two a grain of opium in the form of a pill was given two or three times a day; but this treatment had no effect. The administration of milk by the mouth was persisted in for four or five days, at the end of which time, feeling a good deal puzzled and disheartened, I gave more serious thought to the incidents of her case than I had previously done, and discussed them fully with my class. I had hitherto assumed that she was suffering from extreme irritability of the stomach, and that it was this irritability which caused her to vomit constantly. But I now called to mind that she had never complained of actual pain or tenderness in the region of the stomach; that she was not flatulent; that her vomiting was

an easy process with her ; and especially that she brought back the greater part of the minutest quantities of food taken, and in whatever form it was taken. And I asked myself the question, ' Was it possible that the bulk of her food never entered the stomach at all, but was retained in the œsophagus and thence regurgitated ? ' I had other reasons, which I have already fully explained, which helped to suggest this question, and inclined me to answer it in the affirmative. I now made the girl swallow a dessertspoonful of milk in my presence, and watched the progress of events. She swallowed it without difficulty, and evidently it went beyond the influence of the pharynx ; then she appeared to suffer from some discomfort ; and in the course of a minute or so, without any very violent effort, but with a certain amount of spasmodic action, the milk was gulped up into the mouth.

I then (on June 11th) got Mr. Pitts, the resident assistant surgeon, to see the patient with me. And at my request, and in my presence, he passed a medium-sized indiarubber tube along the œsophagus into the stomach, and then injected into that organ about three ounces of milk. There was a little impediment to the passage of the instrument in the lower part of the tube ; but it was readily overcome, and evidently was not due to any organic disease. The milk thus injected did not provoke any feeling of sickness, and remained in the stomach without causing discomfort. She did, immediately after the removal of the tube, regurgitate a small quantity of milk ; but this was clearly only the milk which escaped into the œsophagus during the withdrawal of the instrument.

It was intended to feed her daily by the tube, but she never required it again during her stay in the hospital. For the next day or two she took milk in small quantities, returning a little of it only occasionally. Two days after the use of the tube, she began to take a tablespoonful of milk every hour, which she retained. The next day a teacupful of milk, with a little tea in it to give it flavour, was ordered to be given several times a day instead, and a little bread-and-butter was added. These also were retained. The next day her allowance of food was increased by a small quantity of custard-pudding ; and thus by degrees her diet was improved in quality and increased in quantity until, at the end of two or three weeks (or about June 28), she was taking daily a fair quantity of milk, together with two eggs, fish, pudding, and bread-and-butter. The nutrient enemata, however, were persisted in for a day or two longer, and were then discontinued, partly because their more nutritive ingredients had been withdrawn for administration by the mouth, partly because the bowels, which had hitherto been consti-

pated, became loose. The diarrhœa troubled her for about a fortnight, and had to be treated by astringents. But she continued to take food in increasing quantities up to the time of her leaving the hospital.

It must be observed that the patient to the last appeared to have no desire for food, and to derive no pleasure or comfort from taking it. She took it only because she was compelled; but she took it without difficulty or discomfort. Only on one or two occasions did she vomit any of it. She did not gain flesh very appreciably, and, in fact, when she left only weighed two pounds more than she had done on admission, and three more than at her period of greatest enfeeblement and emaciation. The continued diarrhœa may, to some extent, have retarded her progress in this particular. But in other respects the improvement, if slow, was marked; she certainly got stronger and more cheerful, and her aspect and complexion assumed the characters of health. Moreover, her temperature, which for the greater part of her stay in the hospital had ranged between 95° and 98° , during the last few weeks seldom fell below 97° , and generally varied between one or two tenths of a degree above 98° and one or two tenths below it. The pulse was generally very slow throughout her illness, varying perhaps between 40 and 60, but latterly it rose occasionally to 70 or 80.

She left the hospital, on July 29, cured of the vomiting and generally benefited in health, but not so much benefited as I could have wished. The fact is she fretted so much, and so persistently, to go home, that at length, fearing her constant fretting might be retarding her convalescence, I reluctantly complied with her wish. It was clear, however, that though she was thus cured of one important outcome of her hysterical condition, the fundamental malady still remained. The hip-joint continued painful; and I was scarcely surprised to hear that, a month or two later, during my absence from town, there had been a recurrence of the vomiting, and that her mother had brought her to the hospital to have the œsophagus-tube re-introduced.

I have little to add by way of comment. There is no doubt of course that, in most cases of hysterical vomiting, it is the stomach that rejects the food. But it is obvious that in an undetermined minority of cases of such vomiting, of which my case is an example, it is the œsophagus rather than the stomach that is in fault, and if, in such cases, the irritability or spasm of the gullet can only be overcome, and the food swallowed be

allowed to reach its destination, the vomiting will cease. If one has reason to suspect the latter condition to be the cause of his patient's symptoms, it is fortunately easy to put the question beyond doubt by having recourse to the œsophagus-tube or stomach-pump; and, if the answer be in the affirmative, to cure the patient of her malady by the repeated use of the instrument and artificial feeding. There is reason, however, to hope that a single introduction may suffice to effect a more or less permanent cure.

How often one has reason to wish that the past with its misapprehended experience could be recalled! I have often thought, since I learnt the lesson which my hysterical girl taught me, that the two cases which I quoted at the beginning of my paper were cases of the same kind as hers, and might have been cured with comparative ease and rapidity.

IV.

ON A PECULIAR FORM OF CHOKING CAUSED
MAINLY BY SWALLOWING FLUIDS.

THERE are various forms of choking. But my present concern is with one clinical variety only of it—that, namely, in which the patient performs the act of deglutition with perfect facility and without discomfort, and only at the end of two or three seconds, when presumably the mouthful has passed beyond the laryngeal orifice and is far on its way to the stomach or has already reached it, begins to choke, and presently, after a more or less severe paroxysm of coughing, expectorates in part or wholly the swallowed mouthful.

It is not difficult to understand how this should happen in the presence of an ulcerated opening between the trachea and œsophagus. And, indeed, the first instance of it that came under my notice was furnished by a case of this kind. The case was, in many respects, a very interesting one, and was recorded by me in the ninth volume of the *Transactions of the Pathological Society*. I quote it with some omissions and verbal corrections.

CASE 1.—*Gangrenous cavity behind the root of the lung, opening into the left bronchus and œsophagus.*

P. M., a gentleman in reduced circumstances, was admitted into St. Thomas's Hospital under my care on June 4, 1857. About five months previously he began to be troubled with pain in the front of the chest, increased by exercise, and with dyspnœa and slight cough, attended with little or no expectoration. All these symptoms increased steadily, the pain became more severe and constant, the cough more troublesome, the expectoration more copious, though never abundant, the dyspnœa more intense, but never amounting to orthopnœa. During two or three months of this time he was an out-

patient of mine, but I was never able to detect any local signs of thoracic disease beyond occasional irregularity of the heart's action and slight bronchial râles. During the greater part of this time he slept well, his appetite was good, and his bowels were regular.

Nine days before admission he experienced for the first time pain in swallowing solid food, which he referred to the upper part of the larynx. This persisted until June 1, when difficulty in swallowing fluids was superadded, and the day after he found himself totally unable to swallow either solids or fluids, every attempt being attended with extreme distress.

On admission, and for the next three or four days, although very thirsty and not devoid of appetite, he was quite unable to take food without choking, and consequently he was fed by enemata night and morning, and he was ordered half a grain of opium every six hours.

On the 9th I made the following note: 'Is very weak, but retains the injections and appears to have derived some benefit from them. His thirst has much diminished. Still incapable of swallowing any kind of food, although he manages to take the small opium pills. To-day I made him attempt to take some milk in my presence. He first took a teaspoonful, and performed the act of deglutition in a perfectly healthy manner; but in about a couple of seconds, and at the moment when he was about to repeat the dose, he was attacked with a violent spasmodic fit of coughing, which lasted for some little time, and ended by his coughing up what he had swallowed in a frothy condition and mixed with a little mucus. There is no tenderness or swelling about the larynx or trachea; the fauces are healthy, and the epiglottis (which can be readily seen) also seems healthy. The cough has become much more severe since he has been unable to swallow; the paroxysms are now very frequent, and he expectorates a large quantity of yellowish-brown, slightly tenacious mucus, which (together with his breath) yields an offensive, gangrenous odour.'

June 11. Decidedly weaker. Still thirsty and unable to swallow, but retains his injections. Cough troublesome, breath fœtid, expectoration copious and puriform. Anterior part of chest resonant, with here and there a little rhonchus and sub-crepitation. Upper part of chest behind resonant, lower part duller than natural. Lower part of left lung decidedly dull, and markedly more so than the corresponding part of the right. There is considerable deficiency of vocal fremitus over this region; the inspiratory sounds are scarcely perceptible, and near the spine, a little below the angle of the scapula, the expiration is distinctly amphoric, and the cough

accompanied by a splashing sound. Similar sounds to those heard in front are audible over the rest of the back. Heart-sounds healthy; pulse 100, irregular.

June 12. Much worse. Excessively feeble and short-breathed; pulse irregular, about 140. Has a very severe stitch in the left side, which has been coming on for the last three or four days. Cough troublesome; expectoration and breath fœtid. A bougie was passed carefully, for the sake of ascertaining whether any obstruction existed in the course of the œsophagus; and none being detected, and no ill-effects produced, it was decided that he should have beef-tea, with two glasses of wine, administered twice a day by means of the stomach-pump.

June 13. He was fed successfully by the stomach-pump last evening and this morning; but his weakness increased, and he died at 10 A.M.

Post-mortem Examination.—There were a few adhesions at the anterior part of the right pleura, and here and there on the lower part of its visceral layer were thin films of recently-deposited lymph. The right lung was large and heavy, and slightly emphysematous at apex and base; it was crepitant, though sparsely so, in the greater part of its extent. A considerable portion of its upper lobe had a dark greenish hue and a fœtid smell. In the lower lobe was a large mass of blackened indurated tissue, the result of old disease, together with several smaller patches, which were pale, granular, lacerable, and solid. The pericardium was for the most part healthy, but immediately below the point where the pulmonary veins open into the auricle, was a small patch in which the membrane was softened, discoloured, and covered with lymph. The heart was pale and flabby. There were a few nodules of earthy matter in the base of the aortic, and a little atheroma in the mitral, valve; but both were competent. On opening the left pleural cavity, the corresponding lung was found to be invested, and slightly adherent to the parietes, by a layer of soft lymph. On removing the organ, a gangrenous cavity about as large as a hen's egg was discovered immediately behind the root, between it, the œsophagus, aorta, and heads of the adjacent ribs. This cavity was essentially external to the lung, though the surface in contact with it was partly destroyed and sloughy. The distal portion of the left bronchus, and the commencement of two or three of its branches, were destroyed behind, to the extent of half their circumference, and opened freely into the cavity by a branching orifice, which was altogether about half a square inch in area, and of which the margins were irregular and studded with projecting fragments of denuded cartilage. The

œsophagus also communicated with the cavity by a longitudinal slit, about an inch and a half long, situated at the junction of its front and left side. The orifice looked as though it had been formed by laceration, for the mucous membrane around it was not discoloured, and the margins were thin and shreddy. The muscular coat, however, was eroded, and contributed to form the parietes of the cavity. The aorta was partially surrounded by the abscess, and took part in the formation of its walls, but its own did not appear to be materially injured. The left lung was large and heavy; its upper lobe was sparsely crepitant; its lower contained scarcely any air, was nearly solid, lacerable, and had a greenish tinge, and the bronchial tubes connected with it were nearly full of purulent fluid. Larynx, trachea, and right bronchus healthy, excepting that the mucous membrane was somewhat congested, and towards the lower part of a greenish hue. The lining membrane of the left bronchus was thickened and much discoloured. Situated between the two bronchi were numerous large, black, soft, and in some instances pulpy, bronchial glands; and from the situation of the gangrenous abscess it is probable that this had its origin in similarly diseased glands. The œsophagus was healthy, excepting at the seat of perforation. All the abdominal viscera were healthy.

I need scarcely say that, during the two or three months in which P. M. was an out-patient, I was unable to form any definite opinion as to the nature of his disease. But the remarkable symptoms which he exhibited during the nine days he was in the hospital clearly indicated the character of the mischief which had been going on, at any rate, during the last three weeks of his life.

The gangrenous odour of his breath and expectoration pointed unmistakably to gangrene in connection with the lungs; the choking which, at an interval of two or three seconds, followed the act of deglutition, and was followed by the expectoration of the food which had been swallowed, pointed with equal certainty to a communication between the œsophagus and trachea or one of the larger bronchial tubes; and the well-marked cavernous breathing between the angle of the left scapula and the spine, over the situation of the root of the left lung, clearly indicated the presence of a cavity in that situation, and rendered it more than probable that this was the seat of gangrene, and the spot in which the communication between the

oesophagus and air-passages had been established. The autopsy confirmed the accuracy of the diagnosis.

I need not quote other cases which I have met with of ulcerative communication between the oesophagus and trachea or larger bronchi; because, although I can readily recall several in which, during the progress of cancer of the oesophagus such communications have formed, and the difficulty of swallowing has presented something of the character described in the foregoing case, the special difficulty has arisen late, and its peculiar symptoms have consequently not been so simply and so strikingly displayed. The above case was a very instructive one to me, and its main features have always remained in my memory. It is not surprising, therefore, that I was temporarily misled in my diagnosis when recently a case, presenting almost identical symptoms of choking after swallowing, presented itself before me.

CASE 2.—*Paralysis of arytenoid muscle, &c., with choking when swallowing fluids.*

J. H. A., a clerk, aged 44, was sent to me by my colleague, Dr. Semon, on December 7, 1886. He had had syphilis ten years previously, followed by secondary symptoms. But otherwise he had had good health up to the previous March, when he was attacked with sore-throat, the nature of which remains somewhat uncertain. However, during its continuance he experienced some impairment of voice, and some difficulty in swallowing both fluids and solids. When the soreness of throat had subsided, his voice was left impaired, and he found that, although he could swallow solids with perfect ease, fluids invariably caused choking. After a time he placed himself under Dr. Semon's care, who recognised some small growths below the vocal cords, and that there was paralysis of the arytenoid muscle, in consequence of which the arytenoid cartilages were not approximated when the vocal cords were brought into apposition, and a triangular chink remained unclosed at the posterior extremity of the rima glottidis. This fact, however, though it explained the huskiness of voice, did not seem fully to explain the difficulty in swallowing fluids, for in recorded cases of this kind of paralysis such choking had seemingly not been observed. The manner of choking was very peculiar. There was no doubt that the patient could swallow solids with perfect freedom. He could also, when drinking, perform the act of deglutition without any hitch.

But invariably within a second or two after a mouthful of liquid had been swallowed, and at a time, therefore, when it had presumably passed beyond the larynx and reached the lower part of the œsophagus, he began to choke and presently coughed up some of the swallowed fluid. The phenomena were just what might be expected to happen where there is a communication between the œsophagus and trachea, and were just such as were observed in the case first narrated. And, looking not only to the symptoms but to the syphilitic history, to the affection of the throat which immediately preceded the onset of his difficulty, and to the presence of small growths below the rima, I at first assumed that such a communication existed in the present case.

That assumption, however, was disproved. For Dr. C. Evans, my house physician, in my presence investigated this point by feeding the patient with milk through an œsophagus-tube, first passed into the stomach, and then gradually withdrawn, and thus found that no choking occurred until the lower orifice of the tube reached the level of the larynx. He ascertained, also, on further examination, that there was distinct impairment of sensibility and of reflex excitability in the laryngeal mucous membrane, more especially in the inter-arytenoid fold—an observation which was confirmed by Dr. Semon. The explanation of the choking was now clear; at least, so it seemed to me. I assumed that, in consequence of the non-approximation of the arytenoid cartilages during deglutition, the portion of the laryngeal cavity situated above the vocal cords remained incompletely cut off from the tube along which food was passing; that, in consequence of their ready diffusibility, fluids, while being urged onwards into the œsophagus, were also driven through the inter-arytenoid chink into the space above the vocal cords; and that actual choking was induced by this fluid remaining there up to the moment when the inspiration, which naturally follows the act of swallowing, sucked it into the wind-pipe. The obtuse sensibility of the mucous membrane of course explained the absence of irritation due to the foreign matter in this unwonted locality. I tested the truth of this hypothesis by making the patient drink and hold his breath as long as he could after swallowing. And, although he was apt to choke after a time, even before he inspired, there was no doubt that, by holding his breath, choking was retarded, and that choking always came on, or was aggravated, with the first inspiration.

The most interesting confirmation was furnished later. After the patient had left the hospital and passed from under my care, he continued to attend as an out-patient of Dr. Semon's, who one day

sent him up to me to show me how, though his paralysis remained, he had learnt to circumvent his difficulty in swallowing fluids. He had discovered that when stooping from the standing posture so as to put his head between his legs, he could drink without difficulty; whereas still, if he drank in the ordinary way, choking followed. I expressed my surprise at his having thought of this manœuvre, when I was reminded that, just prior to his leaving the hospital I had, in talking to him and to the students, remarked that, if his affection should not be cured, he would have to swallow (if he wanted to enjoy drink) while standing on his head; and then learnt that he had simply put into practice the suggestion I had half-jokingly made. My reason for making this remark was that it seemed to me that if the patient's choking were due to the inhalation of fluid accumulated above the vocal cords, it should be obviated if by any means this fluid could be made to escape thence before the patient could draw a breath; and that, if he stood on his head while drinking, it would, from the influence of gravity, trickle back into his mouth as the upper orifice of the larynx was opening at the end of the act of deglutition and preparatory to inspiration.

At the end of two years from the time when I first saw this patient there had been no change, certainly no improvement, in his condition.

In conclusion I will call attention to certain incidents of a case which appears elsewhere in this volume (*see* paper on Diphtheritic Paralysis, p. 357). It is the case of a woman who was suffering from paralysis of her diaphragm, and for a time difficulty in swallowing fluids exactly resembling that observed in the last case; and in whom (owing to the associated paralysis of the diaphragm) the attacks of choking were prolonged, and on several occasions appeared to threaten life. 'She had no paralysis of the mouth or soft palate, her voice was not nasal or hoarse, and she could swallow solids without difficulty; but whenever she took even a mouthful of fluid, it was ejected in a few seconds with the symptoms of choking. She had no difficulty in carrying the fluid to the back of the mouth, and performing the act of deglutition; and it was not until a second or two had elapsed after the performance of the latter act, until the fluid had presumably passed some distance along the œsophagus, that the choking came on, that she coughed, and brought up with coughing the fluid she had swallowed. I was

puzzled to explain these attacks ; and, seeing that they did not occur until the swallowed fluid had had ample time to reach the lower end of the œsophagus, I was inclined to associate them with the diaphragmatic paralysis.'

The case of the woman occurred before the one which I have just narrated in detail. I do not pretend even now to explain satisfactorily the mechanism of her difficulty of swallowing and choking. But the phenomena she presented were so exactly like those presented by the other patient, that I can scarcely doubt that she also suffered from a combination of anæsthesia with some paralytic affection of the muscles which cut off the communication between the pharynx and larynx during the act of swallowing. Unfortunately no examination of her throat was made at the time when such an examination might have thrown light upon the subject.

It will have been observed that in all the above cases it was mainly the swallowing of fluids that was attended with choking, and that in the last two, indeed, there was no difficulty whatever in swallowing solids. The explanation of this phenomenon has already been given incidentally, and is obvious. It is probably needless to point out, and yet it is interesting, that in cases of mere œsophageal obstruction it is in the swallowing of solids that the earliest and chief difficulty is manifested. Fluids often pass readily at a time when solid food cannot be taken.

V.

*CASES OF FUNCTIONAL NERVOUS DISORDER,
in which there were Ophthalmoplegia externa, Hemiplegia,
Hemianæsthesia, High Temperature, Epileptiform Fits, &c.*¹

THE cases on which mainly this paper is based were of long-continued and great interest to those who watched their progress while they were under my care. They were cases of ophthalmoplegia; but, like so many cases of ocular paralysis, they were something more; and it was the combination of phenomena exhibited by them, rather than the ophthalmoplegia, which gave them their special interest.

The first case was in St. Thomas's for two years, and ultimately ended fatally there. But I did not know until, I think, after the death of the patient, that her case had already been published by Dr. Warner, in the 66th volume of the *Medico-Chirurgical Transactions*; nor did I know of some of the facts concerning her which he records, and which give additional interest to her case. His paper is entitled 'Ophthalmoplegia Externa, complicating a case of Graves's Disease,' and the following is a brief abstract of it. Marion H. had had good health until February 1877, when the catamenia became scanty; and in November she was admitted under Dr. (now Sir) Andrew Clark for tonsillitis, and was then found to present exophthalmos with considerable enlargement of the thyroid. In 1878 she was again admitted for Graves's disease, and suffered from palpitation, dyspnoea, bronchitis, and slight blood-spitting. The temperature sometimes rose as high as 103° without any inflammatory cause. Suffering from the above symptoms, she acted as a hospital nurse for some considerable time. About January 1880 she first experienced

¹ *Brain*, October 1885.

diplopia, which, however, lasted only for a few weeks. In November she began to notice that she was unable to move her eyes properly, and that to look at any object she had to turn her head. She was admitted again in March 1881, and remained seven months under observation. During this time the signs of Graves's disease were present, but not excessive; she was very nervous and irritable; she had frequent attacks of palpitation, dyspnoea, headache, and insomnia, during which the temperature often rose to 102° ; she also suffered from gastric crises, marked by vomiting, diarrhoea, epigastric tenderness, blood-spitting, and thirst. While in the hospital, she was much troubled with inflammation and ulceration of the corneæ; and presented double ptosis, with a double external squint, and incomplete paralysis of all the external ocular muscles. She seems to have improved in health under treatment, and the goitre is said to have disappeared wholly. But the paralytic condition of her eyes and the proptosis remained without material change. It was thought that there was weakness of the 7th and 5th pairs of nerves, with general reduction of sensibility.

She was admitted into St. Thomas's about a couple of months after she left the London Hospital. At that time she had obvious but not extreme exophthalmos, double incomplete ptosis, and almost total fixation of the eyeballs; but there was no defect of accommodation or of the action of the pupils, and the deeper parts of the eyes were healthy. It was soon discovered, also, that she had complete and absolute right hemianæsthesia, with colour-blindness of the right eye, and loss of smell and taste on the same side. But she had no loss of power in the right arm or leg, and could use them as well as the opposite limbs. It did not appear to me that there was involvement of the 5th or 7th pair. The thyroid was not obviously enlarged, and there was no evidence of disease in the thoracic or abdominal organs. She complained of pain in the occipital region, and on the left side of the head.

At this time I knew nothing of her having suffered from Graves's disease; and I was inclined to attribute her ophthalmoplegia externa and right hemianæsthesia to some degenerative change occupying the floor of the anterior part

of the fourth ventricle and the walls of the iter, with extension into the neighbouring sensory tract on the left side, and her exophthalmos to paralytic weakness of the ocular muscles.

About two months after admission she had some inflammation connected with the right ear, attended with deafness ; and she began shortly afterwards to discharge blood from this ear, and somewhat later from the right nostril. These discharges were continued thenceforth to the end of her life ; and six months before her death similar bleeding came on from the opposite ear. The exact sources of these hæmorrhages were never ascertained. But their persistence and abundance led me to suspect that my original view was wrong, and that there might be some slow-growing tumour in the situation where I had thought there was degeneration, and some similar growth implicating the dura mater in the neighbourhood of the petrous bones, and invading the bones themselves. This opinion was not quite gratuitous ; but was based upon the facts of a case admitted about the same time as this patient, in which the concurrence of discharge from one ear, with ocular and other paralyses, was found to be due to the association of a tumour springing from the floor of the fourth ventricle, with similar growths originating in the dura mater of the several fossæ of the skull. The case is published in the 22nd number of *Brain*, and also subsequently in this volume.

In June 1882 the patient vomited for the first time while under my care ; and thenceforth she continued to vomit for the most part two or three times a day. At the end of August in the same year she had an epileptic fit ; and two months later a second, which was succeeded by rigidity and loss of voluntary power in the already anæsthetic right arm and leg. The paralysis and rigidity were persistent. In January 1883 she had her third fit ; and, from that time, fits recurred every two or three weeks. It is important to observe that from time to time new nervous symptoms were added to those already present, but that no such symptom, of any importance, that had once developed ever subsided. During the patient's two years' residence in the hospital, she suffered as she had done, when under Dr. Warner's care, with ulceration of the corneæ ; she was for the most part irritable and difficult to manage,

and occasionally manifested delusions ; and she had attacks of tonsillitis, and of bronchitis.

A very noticeable phenomenon in her case was the almost constant presence of a temperature which ranged between 100° as its lower limit, and 103° , 104° , or even 105° as its higher limit. This had no direct relation to her fits, and was not referrible to any inflammatory condition.

At the end of her two years, she seemed as well in general health as when she first entered the hospital : but she was suffering from headache, sickness, ophthalmoplegia externa, complete anæsthesia of the right side with rigid paralysis of the arm and leg, and repeated hæmorrhages from both ears.

What was the matter with her ? I still concluded that the disease, whatever it was, occupied that portion of the brain which, in the first instance, I thought must be its seat. But I was divided in opinion between the presence of sclerosis and that of some kind of tumour. Against the existence of a tumour were, the absence of optic neuritis, and the fact that none of the cerebral nerves, besides those of the external muscles of the eyes, had become implicated. On the other hand, the persistent headache and sickness, and the involvement of the ears, seemed to me to point to tumour ; and on the whole I leant to that view.

The patient went home ; but a month later was brought back to the hospital, moribund from an attack of bronchitis. I need scarcely say that the post-mortem examination was looked forward to with extreme interest. There were the evidences of the acute bronchitis of which she had died. But the most diligent naked-eye search failed to detect even a trace of disease in the brain or cord, or any of the intracranial tissues. And, after hardening and staining, the most careful microscopic examination revealed no morbid changes whatever in any part of the cord, medulla, or mesocephale. There was no tumour, there was no recognisable degeneration. And, further, the hæmorrhage from the ears remained unaccounted for. But I am inclined to suspect that this part of the autopsy was not made with the same care as the rest of it.

It is a curious fact that a second case, clinically almost identical with the last, came under my care while this was

still in the hospital. Early in January 1883, Gertrude H., a girl of fifteen, was admitted. She had been ill for about a month; and was suffering from headache, giddiness, paresis of the external recti, and weakness and numbness of the right arm. The temperature was normal; there was no optic neuritis, and the pupils acted to light and accommodation. By the autumn, without much change in other respects, she had lost voluntary power over all the external ocular muscles, and the eyes presented a downward and inward squint. Early in 1884 she was still suffering from headache and ophthalmoplegia externa; she was giddy, and staggered in walking; she complained of nausea, but had not been sick; her right arm was weaker than it had been, and her leg also was weak; further, there was impairment of sensation on the right side, mainly observed in the neck and chest, and in the area of distribution of the ulnar nerve. At the end of February it was noticed that the tongue pointed to the right when protruded; and in March she had an attack of left-sided chorea. While suffering from chorea she was sick for the first time, and a day or two afterwards had an epileptic fit. From this time onwards, she suffered severely from headache and giddiness, and from groups of epileptic attacks coming on every week or two, and preceded by aggravation of headache and sickness. Some time in May 1884, after one of her fits, her right arm and leg were found completely paralysed and rigid, the hand being clenched; and they remained in this state thenceforth. About this time, also, she had to take to her bed. When she was discharged from the hospital in February 1885, her general health seemed fairly good. But still she had ophthalmoplegia externa, without any affection of the internal structures of the eyes; her tongue was protruded to the right; her arm and leg were not under her control, and more or less rigid; her anæsthesia continued without much change; and she suffered from headache and giddiness and periodical fits, the headache and giddiness for the most part coming on before each fit.

The close likeness there was between these two cases is certainly very singular. In both there was almost complete ophthalmoplegia externa, in both there was paralysis with rigidity of the right arm and leg, and in both there was more

or less complete right-sided hemianæsthesia; moreover both patients suffered severely from headache and sickness, and frequent fits of an epileptiform character. But there were also interesting, even if they were unimportant, differences between them. In the first case, there was constant bleeding from the ears, and there were also colour-blindness and loss of taste and smell on the right side; all of which were wanting in the second case. And in the second case there was paralysis of the right side of the tongue, which was not observed in the other.

It is an interesting fact, too, that the progress of the second case was attended, as was that of the first, by frequent febrile rises of temperature. But while in the first the elevation of temperature was more or less persistent, and had no apparent relation to anything in particular, in the other it was comparatively rarely present excepting as the forerunner of epileptic fits. The temperature in this case, as a rule, began to rise one, two, three, or even four days before a fit, and on the occurrence of the fit fell almost suddenly to the normal.

The nearly exact resemblance in respect of symptoms and progress of the second case to the first makes it fairly certain that the resemblance extends to their ætiology and morbid anatomy, and that if the nervous centres of Gertrude had been examined, they would have been found, like those of Marion, to all appearance healthy. It is of course impossible to say that there may not have been in the case of Marion minute structural defects in certain parts of the nervous system, which closer scrutiny, guided by a more profound acquaintance with pathology than we at present possess, might have enabled us to recognise. But the same may be said of cases of epilepsy, hysteria, and megrim, in which up to the present time no causative morbid nervous changes have ever been found. And on the same ground of morbid anatomy that justifies us in considering these to be functional diseases, we are justified, I think, in regarding as functional the affections for which Marion and Gertrude were under treatment. That there was something which it is customary to call neurotic in either case is shown by the circumstance, that both patients suffered at one time or another from functional

nervous disorders, that had no apparent relation to the special groups of symptoms for which they sought my advice. Marion had for several years laboured under Graves's disease in a well-marked form; and Gertrude was seized, while under my care, with an apparently imitative attack of chorea of short duration.

If the symptoms which my patients presented are to be looked upon as functional, may they also be regarded as hysterical? The answer to this question must depend, of course, on the meaning we attach to the word 'hysterical.' If every presumably functional nervous disorder occurring in women, to which as yet no other specific name has been given, is to be included in this term, then my cases were, perforce, hysterical. But the reasons for not regarding them as hysterical, in the common though somewhat vague meaning of the term, far outweigh, as it seems to me, the reasons adducible on the other side. It might, no doubt, be argued, that Marion's mental condition was exactly such as characterises many hysterical patients; that her hemianæsthesia resembled accurately the hemianæsthesia not unfrequently met with in hysteria; and that Gertrude's symptoms, following upon those of the other, and developing in the same ward, were imitated from them. But, on the other hand, Gertrude was a uniformly bright, sensible, placid girl, always grateful for whatever was done for her, and a general favourite with the nurses; hemianæsthesia, with involvement of the special senses on the same side, is not necessarily hysterical; and again, though Gertrude knew something of the other patient's symptoms, she did not know them all, or any of them accurately, and those in which she most resembled her were those she could not possibly have imitated, either consciously or unconsciously. The chief reasons, however, against the hysterical hypothesis are:—(1) the gradual and uniform progress of the symptoms from bad to worse (there was never any variability, never any shifting of paralysis or anæsthesia; whatever fresh symptoms accrued were permanent); (2) the character of the fits, which were clearly epileptic; (3) the remarkable prevalence of febrile temperatures without any obvious cause; and lastly, the character of the symptoms and their grouping,

which formed a picture such as I have never read of as occurring, and have never seen, in any case of what has been termed hysteria.

Assuming the disease in either case to be functional, there is still reason, I think, to believe that the functional disturbance on which the symptoms depended occupied mainly the region in which, during Marion's lifetime, I had assumed there was either progressive degeneration or progressive invasion by morbid growth—namely, the floor of the fourth ventricle and walls of the iter, with extension into the neighbouring sensory, and possibly even neighbouring motor, tracts. The hypothetical heat-centre lies close by; and granting its existence, the explanation of the phenomenal temperatures might seem to be easy. The relation of the rising temperature in Gertrude's case to the occurrence of fits reminds one of the similar sequence of phenomena met with in connection with the characteristic fits of general paralytics. In the latter instance, however, the rise of temperature is mostly, if not always, of comparatively short duration. May not the pre-epileptic rises, in the case of Gertrude, have been essentially heat auræ?

A practical advantage in regarding the cases I have cited as functional is, that it fortifies us in the hope, so long as the survivor lives, that she may yet recover, and that many other cases of obscure and progressive brain-disease, which do not seem to be hysterical, and which simulate organic disease, may also prove amenable to treatment or the influence of time.

My third case is that of a man who was under my care for eight months, contemporaneously with Gertrude. His illness seems to have begun about five months previously. He first complained of drooping of the eyelids, and shortly afterwards of occipital headache, giddiness, and vomiting. He also suffered from what was called 'inflammation of the stomach.' While in St. Thomas's he laboured under occipital headache and giddiness; he had double ptosis and external squint; there were upward movement of the right eye, very slight outward movement of both eyes, and rotation of both eyes outwards and downwards, obviously effected by the obliqui superiores; the

pupils were dilated and motionless, and he had no power of accommodation; but in other respects his sight was perfect, and there was neither inflammatory nor degenerative change at the back of the eyes; it was questionable whether there was any weakness of the 7th pair or of the motor branches of the 5th, but there was marked impairment of sensation over the head and neck and upper part of the trunk. While under treatment, he suffered from occasional gastric crises, which were very severe, and once or twice of several days' duration; he had one or two epileptic attacks; and he suffered from frequent paroxysms of alarming dyspnoea, lasting from a few seconds to some minutes. The last were found to be due to paralysis of the abductors of the vocal cords. This patient seems to have had syphilis, but there was no evidence of secondary consequences.

Is this also an example of functional disorder of the nervous centres? If I had not had experience of the other two cases, I should unhesitatingly have attributed this patient's symptoms to sclerosis, affecting the nerve-nuclei in the floor of the fourth ventricle and iter, and extending downwards so as to involve the pneumogastrics and spinal accessories, and the sensory regions of the upper part of the cord. As it is, I confess I strongly incline to that explanation. At the same time, it cannot be denied that there is a close resemblance between this case and the other two; and it is noteworthy that there were no symptoms referrible to the extremities suggestive of disease of the spinal cord.

CASE 1.—*Graves's disease, followed by ophthalmoplegia externa, right hemianæsthesia (involving organs of special sense), headache, sickness, and persistent high temperature, and subsequently by right hemiplegia, epileptic fits, bleeding from the ears, &c. Death from bronchitis. Autopsy.*

Marion H., a single woman, formerly a hospital nurse, aged 25, was admitted into St. Thomas's, under my care, on the 18th of March, 1882.

She stated, that she had never had any serious illness until two years ago, when she had an attack of bronchitis; that eighteen months ago she began to suffer from shortness of breath and palpi-

tation; and that four months ago she first observed drooping of the upper eyelids, and double vision, which at the beginning were occasional only. She thought that her eyes had been unduly prominent for the previous twelve months. Four days before admission she took cold in her eyes from sleeping at an open window. There was no history of syphilis.¹

On admission, she was a well-nourished and, on the whole, healthy-looking woman. She was complaining of headache, and of inflammation of both conjunctivæ. In addition to which there was marked prominence of the eyeballs, incomplete double ptosis, and almost absolute immobility of both eyes, which looked very nearly straight forwards. But the pupils were equal, and acted to light and accommodation. There was no enlargement of the thyroid body. She said she suffered from dyspnoea and palpitation at times; but there were no present signs of these affections. The heart and lungs appeared to be healthy; there were no indications of abdominal disease, and the urine was normal. Tongue clean, appetite good, slept well.

For some weeks after admission she suffered mainly from ophthalmia, which proceeded to ulceration of the corneæ; and for some days she suffered also from inflammation with excoriation of the tonsils. For the former affection she was placed under Mr. Nettle-ship's care, who found it necessary to stitch her eyelids together in order to ensure complete rest. During the time she was under treatment for the eye-affection no very minute investigation of her case was made in reference to other matters. It was noticed, however, that there was anæsthesia of the upper part of the right side of the face; and it was hastily assumed that she had some affection of the fifth nerve, and the corneal ulceration was attributed to this circumstance.

In the early part of May, at which time the inflammatory affection of the eyes had in a great measure subsided, the patient's condition was investigated with much greater care than had hitherto been possible; and the following were the results, which were verified over and over again during the remainder of her life.

She complained of headache, which was variable, sometimes being very severe, sometimes disappearing wholly, and referred either to the occipital region or to the region of the left parieto-occipital suture. There was moderate but marked exophthalmos. The upper eyelids drooped over the eyeballs so as to cover the pupils to a large extent; but could be raised (though very slightly)

¹ This history is inaccurate and incomplete; but is corrected in the earlier part of this paper.

by the action of the occipito-frontales. The ptosis was incomplete ; but the levatores palpebrarum could not raise the lids. The eyes looked very nearly straight forwards ; could not be elevated or depressed ; and could be moved outwards and inwards only within a very minute arc. The pupils were equal, and acted readily to light and accommodation. She saw double, but her sight in most other respects was good, and there was no sign of disease at the fundi of the eyes. There was absolute anæsthesia of the whole of the right side of the body up to the middle line. Nowhere on this side, neither in the conjunctiva, nostril, or mouth, nor in the face, nor in the arm, leg, or trunk, could she feel if she was touched or pricked, or if galvanism, heat, or cold was applied. The parts, however, looked healthy, and there was no difference in temperature, or as regards perspiration, between the two sides ; and she had perfect voluntary power over the anæsthetic parts—could move her arm and leg freely, could stand and walk without difficulty, and could feed herself with her right hand, and do needlework, so long as she saw what she was doing. Indeed, the readiness and accuracy with which she used her right arm and leg, made us doubt for some time whether or not the anæsthesia was real, or at any rate complete, and the more so that she herself tried to conceal this infirmity, and consequently often answered questions about it untruthfully. There was a tendency for food to collect, unknown to her, in the right buccal pouch ; and she stated on some occasions that, when drinking, the cup felt to her lips as if it were broken. The anæsthesia involved also the organs of special sense. She was never able to distinguish odours with the right nostril ; nor could she at any time recognise the taste of sugar, mustard, salt, or any other sapid substance with the right half of her tongue. With her right eye she could distinguish forms quite as well as with her left, but was completely colour-blind ; and while with the left she could sort coloured wools with the utmost nicety, with the right she failed to recognise any colours ; and, without exception, when asked to put together those skeins which most resembled one another, selected the brightest scarlet and the brightest green. It was always very amusing to observe her endeavours, in the first place, to use the left eye surreptitiously when the right eye was being tested, and her look of disgust when on opening both eyes she found enclosed in her hand the inevitable red and green skeins. Indeed, she never would admit her colour-blindness, and always had some excuse to make for her error. There was no muscular paralysis excepting of the ocular muscles, and the tendon-reflexes on both sides were normal.

About the middle of May, the patient complained of a painful swelling of the right cheek a little in front of the ear, and about the same time had a little watery discharge, tinged with blood, from the right auditory meatus. The swelling of the cheek soon subsided; but she suffered a good deal for the next few weeks from severe pain in the right ear and right side of the head; and soon had a pretty constant and pretty abundant discharge of blood, partly fluid, and partly clotted, from the ear; and she became deaf. I believe she was partially deaf of this ear previous to this attack. Mr. Clutton was consulted, and reported that the patient was suffering from acute external auditory catarrh; but he was not sure whether or not it was secondary to similar disease of the middle ear. The acute symptoms disappeared after a time; but thenceforth to the end of her life she had an almost constant and abundant discharge of blood from the ear. Generally she passed a few drachms daily; but occasionally she went for two or three days or more without passing any, and under such circumstances usually complained of increasing headache, which was relieved when the discharge reappeared. Before long, blood came from the right nostril as well as from the right ear; and it was assumed that it reached the nostril from the Eustachian tube. It was never determined satisfactorily whether there was any perforation of the membrana tympani. Her deafness became aggravated after the commencement of the discharge, and soon the deafness on that side became absolute.

About the middle of June she began to vomit occasionally. The sickness recurred from time to time, but often at considerable intervals. On the whole, however, it increased upon her; and for many months before her death she vomited nearly every day, and sometimes several times a day. Nevertheless she maintained a good appetite.

Early in July it was noticed that she rambled occasionally; and towards the end of the month she complained, for many nights in succession, that an old woman, with something black over her head, was sitting by her bedside, and leaning over her. From this time onwards, and even to the end of her life, she was for the most part perfectly sensible; but she occasionally suffered from delusions, and became more and more irritable and exacting, not unfrequently flying into a violent passion, and using the grossest language towards the nurses and others who were waiting upon her.

On the 31st of August she had for the first time an epileptic fit. She was generally convulsed, and passed water into the bed; but she did not utter a cry or bite her tongue. It lasted for a few minutes. When she emerged from the fit her right arm and leg

were found to be partially paralysed, the fingers being flexed; but there was no involvement of the facial muscles or of the tongue.

On the 25th of October she had a second fit of the same character as the first, excepting that it was preceded by a cry. It lasted about five minutes, and then the patient went off into a profound sleep of several hours' duration. Subsequently she became delirious, violent, and noisy, continually crying out, 'My head! my head!' After this fit, the paralysis of arm and leg was complete, the two limbs were rigid, and the arm was kept extended while the fingers were strongly flexed. When the arm was raised from her side, it presented very rapid and fine tremors. The condition of the limbs remained henceforth wholly without change. She never regained even a trace of power over them, and they were always rigid and finely tremulous.

The third fit occurred in January 1883, from which date the fits attacked her, not quite regularly, every two or three weeks. Sometimes they were solitary, sometimes in groups of two or three. They were often ushered in with a cry, and often her urine escaped from her during the attack. She once or twice bit her tongue, but was always more or less violently convulsed, for the most part equally on both sides, and very often at the moment when the fit was coming on threw herself out of bed on to the floor. The occurrence of fits was often preceded by increase of headache, and cessation for a day or two of hæmorrhage from the ear. Generally also about the time of the fits, and more after than before, the patient became noisy and fractious; and occasionally, about this time, suffered from hallucinations.

Very little change of any real importance occurred in the condition of the patient subsequently to her second epileptic fit, after which the right arm and leg had become rigid as well as paralysed. All the symptoms of interest that were present on her admission, or had developed later, continued. But during her long residence in the hospital various minor complications arose. Her general health varied; and observations were from time to time made in confirmation or correction of previous examinations.

Among the complications referred to may be mentioned, first, an attack of tonsillitis with bronchial complication in November 1882; second, the appearance, about the end of March 1883, of bed-sores on the right buttock and sacrum, which, however, never attained a large size, and were healed in the course of a couple of months.

As to her general health, it may be mentioned that, towards the latter part of 1882 and in the early part of 1883, she seemed to be losing flesh and strength; but that, subsequently, she improved in

both of these respects, and then (excepting that she was pale from continuous loss of blood) remained almost without change to the end of her life.

The state of the eyes was examined over and over again. The ptosis and exophthalmos presented slight changes from time to time, and were not always symmetrical; but there was never any definite improvement. The balls of the eyes were almost completely immovable, and looked very nearly straight forwards. It was generally noticed, however, that there were variable, and very slight, lateral movements in both; and that especially there was a slight degree of power in the left external rectus, and consequently an occasional slight outward squint of the left eye. There was sometimes observed a little inequality in the pupils; but it was confirmed that the intraocular muscles acted to light and accommodation. She could see distinctly with both eyes; but the fields of vision (and especially that of the right eye) were contracted. The colour-blindness continued in the right eye; but the left was never similarly affected. The fundi of the eyes remained healthy. The corneal ulceration and conjunctival inflammation were not finally cured until the end of August 1882.

The discharge of blood from the right ear and right nostril continued without abatement, even after all signs of inflammation in the outer ear had abated. Mr. Clutton believed that there was perforation of the *membrana tympani*. She became stone-deaf with this ear. In the beginning of October 1883, bleeding for the first time took place from the left ear also. And from this time forwards the discharge of blood from this ear, like that from the right, was nearly constant, though less copious. The hearing on this side also became impaired.

She never recovered feeling or smell in the right nostril, or feeling or taste in the right half of the mouth, including the lips, cheek, and tongue.

The anæsthesia on the right side of the body persisted. It is stated, however, in the notes that on some occasions there was slight evidence of sensation in the right foot.

The right-sided paralysis involved only the arm and leg, and never extended to the facial muscles or to the tongue. The paralysed limbs did not waste relatively to the others; their tendon reflexes, however, were somewhat more marked, and occasionally both ankle- and knee-clonus were elicited. It was observed by Dr. Hadden that the 'paradoxical contraction' could be obtained in the paralysed limbs. Also, the electrical reactions were investigated by Dr. Kilner, with the following results:—

With faradism, all muscles require a strong current. With continuous current muscles of left side require a stronger current than those of right :—

Right upper arm .	7·500—	7·500 +	Left upper arm .	3·500—	3·500 +
„ forearm flexors	2·503—	·975 +	„ forearm flexors	5·100—	5·100 +
„ „ extensors	2·550—	2·000 +	„ „ extensors	5·100—	5·100 +
„ thigh . . .	5·200—	5·200 +	„ thigh . . .	6·100—	6·100 +
„ leg . . .	3·100—	3·100 +	„ leg . . .	5·300—	5·300 +

The headache, usually referrible to the occipital region, sometimes to the right side, sometimes to the left, and liable to severe exacerbations, continued during her whole illness; and for the greater part of her residence in the hospital she was sick once or more times every day. Yet, notwithstanding this, she did not lose flesh.

A remarkable feature in her case was the almost constant prevalence of high temperature. Occasionally, and even for a few days together, it would go down to the normal. But almost always it ranged between 100° as the lower limit, and 103°, 104°, or even 105° as the higher limit. The cause of this was not apparent. It had no relation to the epileptiform attacks. There was never anything specially noticeable as regards the condition of the thoracic and abdominal viscera, the pulse or urine.

She was discharged on the 23rd of February 1884, having been in the hospital just one year and eleven months; at which time she seemed on the whole as well, and as likely to live, as she had done a year previously.

On the following 25th of March she was brought to the hospital suffering from bronchitis, and moribund. She died early the next morning. It was ascertained that she had had several fits while at home, of which the last occurred a week before admission. The affection of which she died came on at that time.

Autopsy by Dr. Hadden.—There was accumulation of mucus in the bronchial tubes, and distension of the lungs with air. A few granulations were found on the auricular aspect of the mitral valve; but this was neither contracted nor incompetent. The right side of the heart was somewhat dilated and thickened. The tonsils were large, with patches of secretion adherent to the surface. The uterus was retroflexed. All other organs in the chest and abdomen were healthy.

Calvaria, dura mater, and other membranes of brain healthy. There was no flattening of the convolutions; no affection of arteries or nerves; no congestion; no accumulation of serum, either in the ventricles or in the subarachnoid tissue. And generally the substance of the cerebrum and cerebellum was healthy.

There were pale yellow patches, not differing in consistence from the surrounding brain-substance, scattered here and there in both grey and white matter. They appeared to be local areas of anæmia, such as are occasionally seen in otherwise normal brains.

The patches were most evident—(1) in the cortex of the third left transverse frontal convolution; (2) in the outer part of the anterior extremity of the left lenticular nucleus; (3) in the internal capsule and adjoining part of the lenticular nucleus posteriorly. Right anterior crural and median nerves healthy. Cervical sympathetic also healthy.

Microscopical Examination.—Fifty sections from various parts were examined. The cortex and underlying white matter of the left third frontal convolution were healthy, as were also the motor and sensory portions of the internal capsule on the same side, the lenticular nucleus, the claustrum, and the island of Reil.

Nothing abnormal was detected in the corpora quadrigemina. Owing to an error, the condition of the nuclei of the third nerves was not made out.

The fibres of the sixth nerves and their nuclei were perfectly healthy. The nuclei of the facial, spinal accessory, glosso-pharyngeal, vagus, and hypoglossal nerves were also normal.

There was no sclerosis in the pyramidal tract, pons, or medulla oblongata.

The right median nerve and the superior cervical ganglia of the sympathetic were normal.

There was a great deal of fat in the orbits; and the ocular muscles were unusually pale, and seemed stretched. The right membrana tympani was perforated, but no disease of the middle or external ear was found on either side. There was some blood in the right meatus. But the source of the hæmorrhage during life was not discovered. The lobes of the thyroid body were somewhat large.

CASE 2.—Ophthalmoplegia externa, right hemiplegia, headache and sickness, followed by partial right hemianæsthesia, and epileptic fits, preceded by prolonged rises of temperature. Chorea during the progress of patient's illness. No result.

Gertrude H., aged 15, was admitted under my care on the 4th of January, 1883.

On the whole she had been a healthy girl; but had had fits from the age of 18 months to that of 5 years; and, about three months ago, a slight sore-throat, which did not require medical treatment. She had never had rheumatism or scarlet fever.

After suffering about a week from giddiness, and headache referred to the right side, she was attacked suddenly on the 1st of December last with an internal squint of the right eye. And on, or about, the 30th of the month she first complained of weakness, numbness, and tingling of the right arm. She had no sickness.

She was a pale, but healthy-looking girl; complaining of headache on the right side, double vision, and weakness and numbness of the right arm. She kept her right eye closed voluntarily because by so doing she prevented giddiness and saw better. There was obvious weakness of both external recti; but the left was distinctly feebler than the right; and she saw double when both eyes were open. The pupils were equal, and acted naturally. There was no affection of the optic discs. The right arm was partially paralysed, and the grasp of the hand was very feeble compared with that of the left. There was also some numbness in it; and it was thought that (though the patient did not acknowledge loss of feeling on the right side generally) there was less accurate tactile discrimination on this side than on the other. There was no facial or lingual paralysis, or paralysis of the leg; and no deafness, colour-blindness, or loss of smell or taste.

She sojourned in the hospital for two months; during the whole of which time her condition remained practically unchanged. The paralysis of the external recti and right arm persisted; she complained more or less constantly of pain on the right side of the head, and frequently of giddiness. She often suffered from nausea; but was sick on only one or two occasions. No affection of the pupils, and no optic neuritis, ever appeared. It was ascertained that the reason why she kept the right eye closed in preference to the left (which was the less paralysed one) was that the vision of the right eye, owing to short-sightedness and astigmatism, was less perfect than that of the left. There was no discovered disease of the abdominal or thoracic viscera. Her mental condition was good; but she was a little inclined to be low-spirited.

Her treatment consisted first in the use of tonics, later in that of iodide of potassium; and in the application, on one or two occasions, of leeches and counter-irritants to the temples.

On March 3rd she was sent to a convalescent home, where she remained for a month without benefit. Shortly after her return, she came up to see me, when I found the right pupil dilated and immovable. This affection, however, was only temporary; and at the next visit the pupils were again equal and active. There was still no optic neuritis.

From this time to February 1884, she came to me as an out-

patient at irregular intervals. Her general health remained much as it had been. She continued to suffer from headache, referrible sometimes to the right side, sometimes to the back of the head, and occasionally extending to the back of the neck, variable in intensity and often very severe; from giddiness; from occasional nausea, but never sickness; and from weakness in the right arm. But the paralysis of the ocular muscles slowly extended; so that by the autumn there was paralysis of all those which move the eyeballs; and the eyes were fixed in the downward and inward direction, and the lids drooped. There was no affection of the muscles of the irides or of accommodation, and none of the fundi of the eyes. She still, as a rule, kept her right eye closed.

On February 5th, 1884, she was readmitted, and she remained in the hospital until February 2nd, 1885. The following is a statement of her condition at the earlier of these dates. She was a well-nourished, well-behaved, and happy-dispositioned girl. She complained of pain at the back of the head, and of giddiness, in consequence of which she staggered in walking. She suffered from occasional nausea, but not actual sickness. The right arm was weak, and the grasp of the hand much less powerful than that of the other. The right leg also was somewhat weak. There was some impairment of sensation on the right side of neck and upper part of right side of chest, and in the distribution of the right ulnar nerve; and generally also over the right side the power of localising impressions was imperfect. No wasting of muscles, no rigidity. The knee-jerks were exaggerated; and ankle-clonus was obtainable on both sides, but chiefly on right. There was slight double ptosis, and almost complete immobility of the eyeballs, which looked downwards and inwards, the right being most affected. The pupils were equal, and acted normally; accommodation was perfect, and there was no trace of optic neuritis. No paralysis of face or tongue. Taste, smell, and hearing apparently good. Eyesight also good; no colour-blindness. In reading, her habit was to keep her face still, and to move the book horizontally in front of her eye, so as to bring the consecutive words successively into the line of vision. It was observed at this time, as it had been when she was an out-patient, that, though she appeared to have no voluntary power over the eyeballs, they occasionally executed involuntary movements. Her appetite was good, her bowels regular, her urine normal.

About the end of February it was noted that her arm and leg had become somewhat weaker, that the arm occasionally trembled, and that she protruded her tongue towards the right.

On March 6th she began to have choreic movements of the left arm and leg. These increased rapidly during the next few days, and soon involved the muscles of the head and neck, and of expression, but did not extend to the right arm or leg. The tongue was protruded in characteristic choreic fashion, but pointed now strongly to the right, and, on being withdrawn, its point swept round to the left angle of the mouth, before it completely disappeared between the lips. It was now stated that she had had chorea when she was ten years old. And it may be added that her present attack of chorea followed on the admission of a case of chorea into an adjoining bed. The attack was not a severe one, and had subsided by the 19th of March. No cardiac complication was discovered.

On the evening of March 9th she was sick for the first time since admission; and the next morning her headache was unusually severe. On the night of the 12th she, for the first time, had a fit, which lasted for about eight minutes. It began with sighing and crying, and rigidity of right arm and leg, the left arm and leg presenting choreic movements. She was insensible for five minutes. She did not bite her tongue, or pass her water into the bed, nor did she become livid. She had very intense headache afterwards, and scarcely slept all night. On the 18th she was again sick, and early on the morning of the 22nd had another fit, much like the former one. During its progress the right limbs first became rigid, and subsequently the left limbs. The conjunctivæ were found to be insensible.

From this time forwards the sickness became frequent; the fits recurred at intervals, varying from a few days to a fortnight; the headache grew very severe, especially in connection with the attacks of vomiting and the fits; and she had increased giddiness. Indeed from about the middle of April she was unable to stand or walk without assistance, and consequently had to remain in bed. The sickness was independent of food, and did not as a rule interfere with her appetite. The fits for a time were exact counterparts of those above described. But before long they began to occur in groups of two or three, and to present other features of interest. While at first there was no affection of temperature before, during, or after the fits, about the middle of May, and always subsequently, the temperature would begin to rise two or three or four days before the occurrence of the fits, so that as a general rule we could foretell their occurrence. With the onset of the fits, and during their progress, the temperature would fall; until on their subsidence it was found normal or subnormal. The fits came on at various times of the day, but mostly in the evening, and sometimes while she was

asleep. They were generally preceded by intense headache, giddiness, and vomiting. She was quite unconscious during their continuance, which varied between five minutes and half an hour; and was generally more or less violently convulsed, the convulsions being general, and involving the facial muscles. The left arm and leg often became rigid and extended, and the hand clenched. On several occasions she passed water during the fits, and once bit her tongue. After all except the very earliest fits, she remained in a semi-comatose condition for twelve or twenty-four hours, or longer, during which time her pulse often rose to 130 or 140; she was apt to be restless, to pull at her hair, to moan, and to cry out in low tones, 'Nurse, dear,' 'nurse!' 'quick!' 'oh, my head!' 'mother,' &c. The left arm and leg on several occasions remained rigid for some time after a fit.

After a group of fits on the 4th of May it was observed that she had lost power wholly in the right arm, and almost wholly in the right leg. The limbs were rigid and extended, and also slightly tremulous when lifted from the bed. The hand was clenched. These phenomena persisted with little change.

There was little subsequent change in her condition. The following was her state when she was discharged on the 2nd of February 1885. She was still a fairly healthy-looking and plump girl; and cheerful and sensible when free from pain and fits. The muscles of her eyeballs were affected, as they had been all along; and she had a persistent double downward and inward squint. The ptosis was less marked than on admission; and occasionally still the eyeballs would move apparently independently of her will. She read, as she had done at first, by moving her book, and not her head or eyes. The pupils were equal and active. There was no loss of accommodation. No affection of the fundi had arisen. She had no colour-blindness. The tongue was still protruded strongly to the right, and its tip swept from right to left on being withdrawn. The right arm did not respond to voluntary impulses; and it remained more or less rigid and extended with the hand clenched. The right leg had perhaps undergone some slight improvement. The condition of the arm and leg was maintained during sleep. There were always exaggerated tendon-reflexes in both lower extremities, and occasionally ankle-clonus could be obtained, more especially on the right side. The impairment of sensation persisted on the right side; and continued best marked on the right side of the neck, and upper part of the same side of the chest, behind the right ear, and in the distribution of the right ulnar nerve. It was discovered also that the right side of the

tongue was insensible to tactile impressions, and that the right half of the soft palate and the epiglottis were in the same condition. There was impaired sensibility also over the whole of the larynx. Smell and taste were defective on the right side. She still remained liable to fits; was rarely free from headache, which was often exceedingly intense; was frequently sick; complained of giddiness; and remained confined to bed. There was no wasting of muscles, no loss of power over the excretories. The catamenia appeared for the first time while she was under treatment.

There are several points in the case that call for more detailed consideration than has yet been given.

(1) The fits appeared to me to be true epileptic fits; but there were features about them which gave them a special interest. The first fit occurred, as has been stated, late in the evening of March 12th. It began with sobbing; was attended with rigidity, convulsions, and insensibility; lasted a few minutes, and was succeeded by intense headache. This fit came on while she was suffering from chorea. The succeeding few fits were of the same character; but it is said of one or two of them that, though insensible, she sighed during their whole continuance; and the later of them were succeeded not only by intense headache, but by a semi-comatose state, lasting for some hours, in which she was constantly moaning, and making low ejaculations, mainly complaints as to her head, and appeals to her mother and the nurse.

On the night of May 12th she had a series of three fits, and it was noticed (and I believed occurred) for the first time that the temperature (which had previously been normal) gradually rose for six-and-thirty hours previous to the fits, and fell rapidly to the normal after them. This phenomenon attended all subsequent outbreaks; and for the most part we were enabled henceforth to predict the supervention of fits, two, three, or even four days before they actually occurred. The temperature began to rise at a time when she was feeling fairly well; but its increase was always associated with increasing cephalalgia, giddiness, and sickness, and general sense of illness. At the time of its highest elevation the explosion of fits occurred. During their continuance the temperature tended to fall; and as they subsided the fall was rapid. And for the most part it remained normal, or subnormal, during the day or so of semi-consciousness which always supervened. The temperature, at the moment of the occurrence of the fits, varied considerably on different occasions. The lowest was about 101°, and the highest about 105°.

I add, by way of illustration, some selected temperature charts

in connection with the fits, and some of the descriptions given of the fits.

On May 29th the temperature in the morning was normal, and she seemed fairly well. In the evening it had risen to 101.4° , and she was complaining of headache and giddiness. On the evening of the 30th it had reached 102.4° , and her symptoms were aggravated. The next morning it was 103.8° . At 8.30 that evening she had a fit, which was followed in the course of the night by two others. Her temperature was not taken during the fits, but the next morning it had fallen to 98° . She remained semi-comatose until the evening. (Chart 1.)

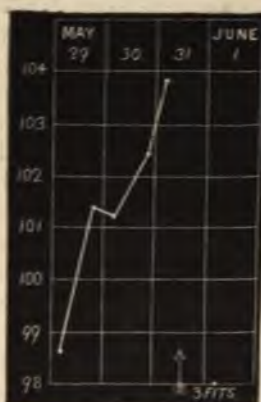


CHART 1.

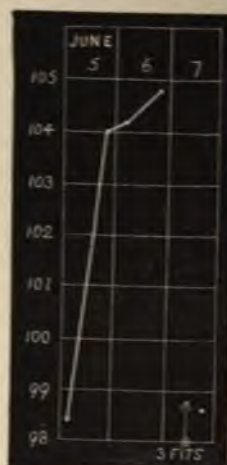


CHART 2.

On the morning of June 5th she was free from headache and giddiness; and her temperature was 98.4° . The temperature rose rapidly during the day, and in the evening was 104° . The next morning it reached 104.2° , and in the evening 104.8° . Shortly after the last temperature was taken, that is about 8 P.M., she had a fit. A second fit occurred at midnight, and a third the following morning at 7. She remained semi-comatose till late in the afternoon of the 7th, at which time her temperature was normal. (Chart 2.)

On the evening of Sept. 5th her temperature was 99.8° , and she was complaining a good deal of headache. During the 6th her temperature rose from 101.4° to 102.6° , and her headache increased. By the evening of the 7th, the thermometer indicated 105° , shortly after which time she had two fits. The next morning her temperature was 97.4° , and she was semi-conscious. She had recovered about noon. (Chart 3.)

On the morning of October 13th the temperature was normal. Later in the day it had risen to 99·6°. It continued to rise irregularly during the 14th, 15th, and 16th, until in the evening of the

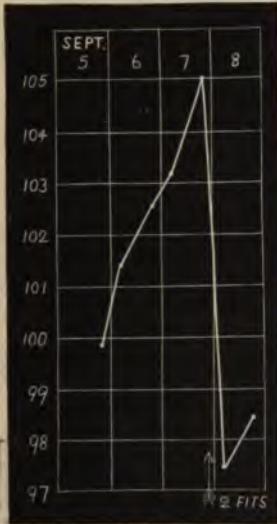


CHART 3.

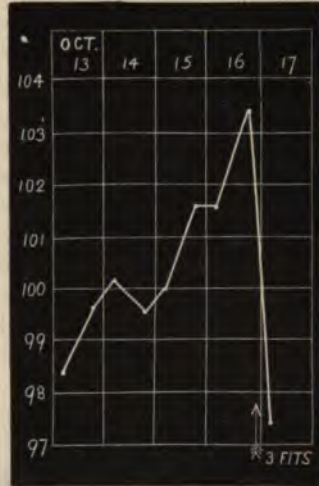


CHART 4.

last day it had attained 103·4°. At 10 P.M. a convulsive fit came on, which was followed at midnight by two others. The temperature had fallen the next morning to 97·4°. (Chart 4.)

On the morning of Dec. 15th her temperature was 98·4°. From this time it rose irregularly, with increasing headache, until 5·30 P.M. on the 17th, when it had reached 101·4°. At 7 P.M. the patient became unconscious, with noisy and laboured breathing. About 7·10 she was attacked with convulsions, first on the left, then on the right side. There were also twitchings of the mouth. The attack lasted 15 minutes. At 7·35 she had another convulsive fit of 15 minutes' duration; and at 8·30 another, which lasted off and on for 35 minutes. During the last fit the convulsions were very violent and she bit her tongue. At 9·30 that night she was still unconscious, but her temperature had fallen to 97·4°. At midnight it was 97°. On the morning of the 18th her temperature had risen again to 101·2°, and at noon she had a fourth fit, lasting 25 minutes, and attended with strong convulsions. At 4 P.M. her temperature was 99°; at 8 P.M., 98·2°. She had recovered completely, but felt tired and sore, at 2 A.M. on the 19th. (Chart 5.)

On the evening of Sept. 29th her temperature was 99·8°. On

the evening of the 30th it had reached 101.4° . The next morning it had fallen a little. But it rose rapidly afterwards, and in the evening reached 104.4° . About this time she became unconscious, with rapid noisy breathing (60 in the minute); and in about 20 minutes convulsions ensued. These were clonic, and affected both sides, but mainly the left. Two other similar convulsive fits followed at short intervals. There were occasional twitchings the right side of the face in the intervals between the fits, and after the last. The tendon-reflexes were exaggerated, and cloni could be readily obtained in both legs at these times, and also in the intervals between successive spasms. Her breathing also was very quiet and scarcely perceptible; her pulse 70. Shortly after the cessation of convulsions she became restless, and began to cry out. The temperature was normal early on the morning of Oct. 2nd; but the patient had not recovered her consciousness until late in the evening of that day. She passed water unconsciously in this group of fits, as she had done occasionally in former attacks. (Chart 6.)

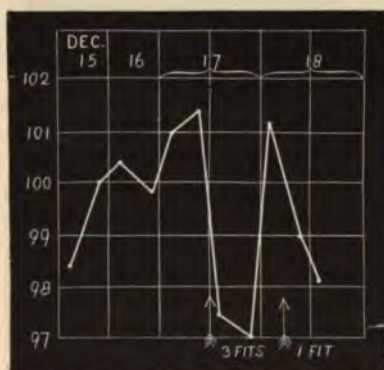


CHART 5.

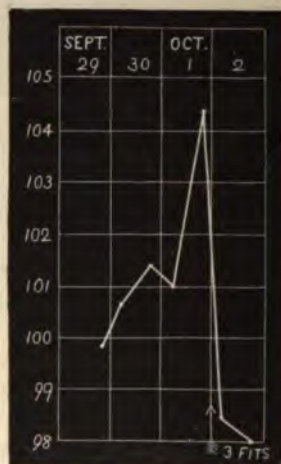


CHART 6.

The last quotation I shall make in respect to fits is from the notes taken on July 16th, and I quote these mainly because a fairly careful record of temperature was made during her epileptic state.

* Temperature has risen continuously for past five days, reaching the maximum (102.6°) at 4 P.M. yesterday afternoon (Jan. 15th). A fit came on at 4.20, whilst the patient was apparently asleep.

For fifteen minutes she was convulsed, throwing her legs, arms, and head about; and at the end of this period the temperature was 99.6° (fall of 3 degrees).

'For the next fifteen minutes she was perfectly quiet; breathing hardly perceptible.

'During the succeeding twenty-five minutes she lay, sometimes convulsed, sometimes trembling, with twitching of mouth, and moaning. Resp. 30; Temp. 100.2° .

'She was then quiet for fifteen minutes, the temperature falling to 99.8° .

'At 5.45 the respirations became quicker, and a second fit came on, commencing as before with convulsions, and passing into quiescence with occasional trembling, and twitching of mouth. Temp. 99.4° .

'At 6.15 she became rather restless, and took to pulling her hair. Temp. 98.4° . She then slept for nearly two hours, during which time the temperature fell to 98° .' (Chart 7.)



CHART 7.

(2) For some time after the patient's admission into the hospital, her temperature (save for a rise due to an attack of tonsillitis) continued normal; and, as I have already stated, her fits during the first two months of their occurrence were not attended with any rise or change of temperature. But from this time, when the onset of fits became invariably preceded by rising body-heat, there were occasional rises of temperature, lasting even for a few days, to which fits did not succeed. The most remarkable of these began on June 9th, and continued for a week. During the greater part

of the time she seemed fairly well. On the night of the 12th, her headache was intense, but it was much less severe the next day. (Chart 8.)

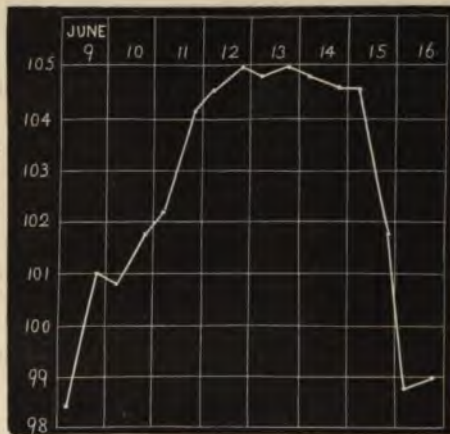


CHART 8.

(3) It will be recollected that it has been stated once or twice in the foregoing notes, that, although the eyes were immovable by voluntary effort, they were occasionally seen to execute considerable lateral movements, which appeared to be involuntary. That the double inward and downward squint was not due to voluntary effort was proved by its persistence without change for many months, not only when she was awake, but when she was asleep, and by her mode of reading, which never altered. At the same time there can be no doubt of the occasional involuntary movements which, though not frequent, were witnessed on different occasions by many persons. The ptosis was never extreme, and seemed to improve of late. Mr. Nettleship, indeed, doubted whether it was true ptosis, and thought that the semi-closure of the lids might be adequately explained by the position which the eyes had assumed. The right arm and leg, after they had become paralysed, remained so. But the rigidity which was associated with the paralysis varied somewhat, and as a general rule the leg was more rigid than the arm.

(4) The position of the pain in the head varied; at first it was mainly on the right side; subsequently it was referred usually to the occipital region; but latterly was most intense about the junction of the sagittal with the coronal suture, or over the frontal bone. The sickness was wholly unconnected with food.

(5) The treatment adopted varied at different times. On several occasions iodide of potassium was continued for some time. Once she was treated with liquor arsenicalis. Again, bromide of potassium in large doses was had recourse to. The pain in the head was often relieved by the application of blisters, or of a few leeches. But the subcutaneous injection of the strong solution of acetate of morphia, in from four- to seven-minim doses, was on the whole most efficacious and most largely employed. The long warning given by rising temperature of the advent of fits encouraged frequent attempts to ward them off. Blisters and leeches, and the bromides of potassium and ammonium, were severally employed more than once with this object, but fruitlessly. On two occasions large doses of quinine were given and repeated, but without any apparent benefit; and on two occasions also, salicylate of soda, in twenty-grain doses every two hours, was administered as soon as there was a warning of fits, and was continued until the fit came on. Without exception the temperature rose in spite of the remedy, and the fits occurred as usual. Whether or not the circumstance was accidental merely, I cannot say; but it was noted that the fits following the use of the salicylate were specially severe.

CASE 3.—*Ophthalmoplegia externa and interna; partial anæsthesia of head and neck and chest; epileptic fits; gastric crises; and attacks of intense dyspnœa dependent on paralysis of the abductors of the vocal cords.*

Robert R., a labourer, 46 years old, was admitted on June 13, 1884, into St. Thomas's, from the hospital at Moorfields, where he had been under treatment for about two months. The following notes, taken at Moorfields, were given me by Mr. Lawford.

‘He had had no illness for many years, and no fits. He had had venereal disease several times; the last time being two years ago, when he had “two sores.” No evidence of constitutional syphilis.

‘His present illness began three months before admission, with drooping of the left upper eyelid. This, he says, improved somewhat. Then the right lid began to droop, and gradually the ptosis became complete on that side. About a month later occipital headache and giddiness came on, with frequent vomiting. Soon after this he was in the Gravesend Infirmary for four weeks for “inflammation of the stomach.” During this time he had severe pains in the belly, and vomiting. Never had incontinence of evacuations.

'On admission. *Right eye*.—Complete paralysis of levator palpebræ. No inward movement of globe. Slight outward movement. Slight downward movement with rotation, as if from superior oblique. Fair upward movement. Eye diverges.

'*Left eye*.—Partial ptosis; about two-thirds of cornea shown—no power of raising lid above its normal position. No inward or upward movement of globe. Very slight outward movement. Slight downward movement effected by superior oblique. Eye diverges.

'Pupils dilated, without action to light. No power of accommodation. Right optic disc normal; left streaky, and sheaths of arteries and veins very visible. Media clear. No colour-blindness.

'There is double partial paralysis of fifth nerve. Motor branches apparently affected; most on right side. Masseters weak. Partial right facial palsy; cannot whistle. Tongue protruded in middle line.

'The patient has constant, though not severe, occipital headache. No vomiting now. Some complaint of giddiness. Is this from the condition of his ocular muscles? No ataxy. Patellar reflexes good.

'The patient was treated with mercury. Salivation was produced, and kept up till May 24. Iodide of potassium was also given. But no appreciable change was observed in any of his symptoms.'

On admission into St. Thomas's he was a fairly nourished, and fairly healthy-looking man, complaining of occipital headache and giddiness. The condition of his eyes was exactly that described by Mr. Lawford. He could not whistle or puff out his cheeks, and his aspect was expressionless; but he could show his gums fairly well, and he laughed symmetrically. I could not satisfy myself that there was any clear paralysis of the facial nerves. When he opened his mouth widely the chin was slightly thrown over towards the left side. This was the only phenomenon which suggested any implication of the motor branches of the fifth. Tongue protruded straight. There was marked impairment of sensation all over face and front of neck; also over front of chest and abdomen to within an inch or two of the umbilicus. There was no weakness or defect of sensation in the arms or legs, and the tendon and superficial reflexes were natural. No impairment of hearing, smell, or taste was detected. His voice and articulation were perfect. His mental condition was unaffected. The abdominal and thoracic viscera appeared to be healthy. He slept well. His tongue was coated, his appetite fair. Bowels regular, urine normal.

Little or no change took place in the nervous symptoms above described during his stay in the hospital. But he presented from time to time several additional interesting phenomena, which I will describe. They were, a sense of weight at the epigastrium, which was sometimes so intense as to make him roll about in bed and cry out; epileptic convulsions, and attacks of intense dyspnœa, in which at times he seemed in immediate danger of death.

(1) He complained pretty constantly of pain across the loins, and occasionally of pain along the spine. But often, and at irregular intervals, he suffered also from a sense of weight or oppression or constriction in the epigastrium (for the most part associated with the dorsal pain), which was often so severe as to make him groan and cry out in agony, but which he did not describe as being actual pain. This sensation was generally aggravated by breathing deeply, speaking, moving, or taking food; and consequently when at his worst he would lie in bed, groaning, speechless, and refusing all nourishment. He felt as if he should be suffocated, and also as if he should be relieved by vomiting. Retching and vomiting indeed were not uncommon, but never gave relief. During these attacks his breathing was for the most part slow and shallow and quiet, but not infrequently a deep inspiration occurred, which was always noisy; the pulse was quick and weak; and the temperature normal. It did not appear to me that he had true dyspeptic symptoms, or that there was any actual loss of appetite or disgust for food. Attacks of the kind above described, sometimes slight, sometimes severe, and lasting for a few hours, or for a day or two at a time, were common. But he had one or two severe attacks of a week or two's duration each, in which his sufferings were constant and most distressing, in which he practically refused all food, and in the course of which he became so weak and ill that it was feared he would sink. At these times he found considerable relief from morphia injections. Ice to the epigastrium comforted him on one or two occasions.

(2) It was during a prolonged bout of epigastric discomfort and vomiting, that on August 11 and 12 he had four fits. These were of sudden occurrence, of short duration, and attended with absolute insensibility and slight convulsive movements of his hands. With the latter exception he lay as if he were dead. In the intervals he vomited, his respirations were 40, laboured and snoring, and his pulse about 130. Another fit occurred on October 9. But there was no further recurrence.

(3) He was liable to sudden attacks of extreme dyspnœa, which

lasted from a second or two to five or ten minutes at a time. The first of these was observed one day while he was at lunch. He suddenly became livid in the face, struggled violently for breath, and made loud snoring inspirations. The dyspnoea subsided after a few minutes. All his other attacks were the same in quality; but often, and more especially during the later period of his stay in the hospital, they were of little more than momentary duration. They came on quite irregularly, sometimes in the day, sometimes at night, and while he was asleep; and were often very alarming. On December 2, Dr. Semon examined his throat with the laryngoscope, and reported that there was complete paralysis of the left abductors, and incomplete paralysis of the right. 'The left vocal cord (the inner border of which is slightly excavated) stands perfectly immovable in the middle line; the right one (which appears similarly excavated) is, on attempt at deep inspiration, hardly drawn outwards to the cadaveric position, so that the chink of the glottis is always very narrow. On attempted phonation, both cords meet completely; the right one and the right arytenoid cartilage being promptly drawn to the middle line.'

(4) While under observation he had a few other accidental complications. Shortly after admission he had some conjunctival inflammation which lasted for a few days. A month or two later his temperature rose for several days, and on one of them he coughed up about an ounce of blood, the exact source of which was not ascertained. And at the beginning of March 1885 he had a sharp and severe attack of erysipelas, commencing from the right eyelid. Excepting at these times, his temperature was always about normal.

His treatment consisted mainly in the persistent use of iodide of potassium and mercury. For his headache and other pains, cannabis indica and morphia (by subcutaneous injection) were occasionally administered; for the attacks of dyspnoea, nitrite of amyl and nitroglycerine; and as local applications to his epigastrium, ice and counter-irritants.

When he left the hospital on March 31, he was still complaining of occasional catches in his breath, especially in the morning, and of some oppression at the chest; and all his paralytic phenomena remained as they have been described. But in his general health he felt better than he had done for a long time.

SEQUEL TO CASE OF GERTRUDE H.¹

In the foregoing paper I gave reasons for believing the symptoms in the second case (that of Gertrude H.), to be due to functional disease of the nervous system; and remarked, 'A practical advantage in regarding the cases I have cited as functional is, that it fortifies me in the hope, so long as the survivor lives, that she may yet recover.'

My patient had undergone no improvement when she passed from under my care on the 2nd of February, 1885. At my request, she was then admitted into St. Bartholomew's Hospital, where she remained for several weeks without material, if any, change. I had authentic information of her condition not long after she left that institution, at which time also no improvement had taken place. Shortly afterwards the family removed from the East of London to Walthamstow, and I lost sight of her. But latterly rumours reached me, through some of the hospital nurses, between whom and her family there has been kept up an irregular correspondence, that the girl had recovered; and on the 16th of November 1886 she came to St. Thomas's with her mother to pay me a visit.

She was thinner than she had been, and pale, but otherwise looked quite well. There was no paralysis of the eyes, which moved freely in all directions and consensually; the pupils were equal, and acted to light and accommodation. I thought the tongue, when protruded, tended slightly to the right, but the deviation was scarcely perceptible. She used both arms and both hands with equal facility; and said that her right hand was as useful as her left, but its grip was certainly not so powerful as that of its fellow. She walked perfectly well; but the knee-jerks were perhaps over-brisk. There was no anæsthesia. She had quite lost her headache, and never now complained of sickness or giddiness. It appears that she had had only two fits after leaving St.

¹ *Brain*, October 1885, p. 328.

Bartholomew's; the first, six weeks after returning home, the second, about two months subsequently. I could not ascertain the order of events in her progress towards recovery; but her recovery seems to have been gradual; and she has been well and able to work like any other healthy young woman for the last twelve months.

VI.

*CASE OF APHEMIA OF NINE MONTHS' DURATION,
in which Speech was restored by the Education of the Organs
of Articulation.*¹

GEORGE EDWARD B., aged 36, was admitted into St. Thomas's Hospital on November 1st, 1869. He gave the following account of himself. He is a native of Canada, and has been for fifteen years in the employment of a steam-packet company as steward, for the last seven years of which time he has been engaged chiefly in the service between India and China. He had enjoyed uninterrupted good health up to the 7th of last March, at which time the steamer to which he was attached was in the Straits of Banca, close to Malacca, *en route* for Singapore. On the morning of that day he complained of headache and feverishness, but did not feel it necessary to give up work. At 1 p.m. he took a strong dose of quinine; and half an hour afterwards was attacked suddenly with giddiness and faintness, and became almost immediately unconscious. He remained in this condition until 5 p.m. He learnt subsequently that during this period of unconsciousness he had had a series of very severe epileptic fits. When he came to, he found himself lying on the floor of the cabin; and soon discovered that, although he could see and understand everything that was going on, he was totally unable to move a limb, had entirely lost the faculty of speech, and was 'stone deaf.' He could not hear a pistol fired off close to his ear. He remained in this condition as nearly as possible up to the time of his arrival at Singapore on March 20. He was then sent to the general hospital, and placed, I believe, under the care of Dr. Randell.

At that time his right leg and arm were still weak; his left leg and arm were numb and quite powerless; he had pain and tenderness of the scalp; he was still perfectly deaf and dumb; and had, further, considerable difficulty in masticating his food, in conse-

¹ *Transactions of Clinical Society*, vol. iii.

quence apparently of the movements of mastication causing him a good deal of pain at the back of the head. He gradually improved in the hospital. In the first week he regained the complete use of his right side, and audition so far returned that he could hear when spoken to loudly. His hearing was completely restored by April 22. He also regained to a great extent the use of his left arm, and improved remarkably in his general health.

Among other remedies employed were quinine, strychnia, hypophosphate of potash, galvanism, shower-baths, counter-irritants, and friction applied to the left leg.

He was dismissed from the hospital in the middle of June, and put on board a sailing vessel homeward-bound. At this time he was still quite incapable of articulation, and had difficulty of mastication, the left leg was useless, and the left arm still so weak that he could not use with it a crutch which had been provided for him.

During his voyage, which occupied over four months, his general health still further improved; he regained the use of his left arm, and lost almost entirely his difficulty of mastication, and he learnt to walk with crutches. He arrived at Liverpool on October 25, and was received into St. Thomas's on November 1.

State on Admission.—He was a man of somewhat low stature and in good condition. He complained of numbness in the left leg, and had little or no power in it or control over it. He would walk tottering with a stick, dragging that leg after him; and in getting into bed he had to lift the limb into it with his hands. There was a good deal of trembling in the leg when he tried to use it, but there were no very obvious reflex movements in it. There was no paralysis of any other limb, and he had, as he had had all along (at all events since his entrance into the hospital at Singapore) perfect control over his rectum and bladder. His hearing, sight, and other special senses were perfect. He complained of pain and tenderness of the scalp, but there was nothing abnormal to be felt there, and of some pain during mastication at the back of the head and neck on the right side, a little behind the mastoid process. He seems also at this time to have had a little difficulty in mastication, yet he could eat solid food, and swallowed with ease. He was unable to speak, but appeared to be sensible. There was no sign of heart, lung, or kidney disease.

Three days after admission I saw the patient for the first time and examined him pretty carefully. I found that he was perfectly intelligent, that he understood everything that was said to him, that he could read well and comprehend everything that he read, and that he could maintain a conversation of any length, he writing on

a slate and his interlocutor speaking. He wrote indeed with remarkable facility a very excellent and legible hand, expressing himself with perfect point and accuracy, except for an occasional error of spelling and construction due evidently to defective education. But he could not speak, he could not utter a single articulate sound. I ascertained, however, that he could perform with his lips, tongue, and cheeks all possible forms of voluntary movement, and also that he was capable of vocal intonation; in other words, that he could produce musical laryngeal sounds. I asked him to hum a tune, and believe that so far as his power over the larynx was concerned he could have done it; but he did not make the attempt.

No change took place in his condition up to about November 25, at which date, having spoken to him casually from time to time during my periodical hospital visits, I had come to the conclusion, judging from the facts of his intelligence, of his perfect ability to understand spoken and written language, and to write, and of his complete voluntary power over the organs of articulation, that his inability to speak was most probably due to his having forgotten how to combine automatically the movements of these organs so as to obtain from them the elementary sounds which in combination constitute articulate speech, and I had determined to make the attempt to teach him.

I explained to him my view of his case, which he appeared to understand; and I began with my first lesson, which lasted five or ten minutes only. I showed him that ordinary vocal sounds are compounded of two factors, namely, laryngeal intonation (which he was already capable of producing) and articulation effected by means of the lips, tongue, and associated parts (which he was as yet totally incapable of producing). I got him then first to sound a laryngeal note; and subsequently, by explaining to him, and showing him, how to modify the shape and size of his oral passage and aperture, and getting him at the same time to expire either with or without laryngeal intonation, made him sound successively, both in a whisper and in a loud voice, several of the simple and more common vowel-sounds—*a* in gate, *a* in art, *a* in all, *e* in feel, *oo* in root, *o* in hole, and that which is sometimes called 'ur vocal'—the vowel sound in the first and last syllables of the adjective 'earlier.' I do not mean to say that he learnt at once to articulate these letters accurately; but he so far succeeded that those about him easily identified his attempts at pronouncing them; and he himself fully recognised his success. At my next visit, three or four days afterwards, I found that he had by practice completely mastered the

sounds which I had taught him, and I set to work to teach him the labials, *p*, *b*, *f*, *v*, and *m*. I may as well, perhaps, explain minutely, in reference to these letters, the method of instruction which I pursued. I closed my lips firmly and then opened them with a sudden smack, and got him to do the same. We both thus pronounced the essential sound of *p*. I asked him if he did not recognise it, and I made him repeat the process until he recognised it fully. I then explained to him that in order to make the sound perfectly clear, it was essential that a vowel-sound should be prefixed or appended to it. And I got him to follow up the sound of *p*, as above produced, by a vocalised *e*. In his first efforts the two sounds were uttered at a considerable interval one after the other, but gradually he approximated them until he succeeded in making them very nearly continuous. There remained, however, even at the end of the lesson, a slight but quite appreciable fault. Then, closing my lips as before, I produced laryngeal intonation without allowing air to escape through my nose, and whilst producing this sound in my throat opened my lips. I made him perform the same acts, and recognise that he had thus, almost without knowing it, articulated the letter *b*. Next, still setting him the example, I made him place his upper teeth upon his lower lip, and blow between them without associating therewith any laryngeal sound; he thus uttered the sound of *f*, and perceived clearly that he had done so. Then, by repeating exactly these actions, with the exception that he was now made to utter a musical note during the period of expiration, he sounded, and recognised that he had sounded, the letter *v*. Finally, I got him to close his lips, and without opening them again to make a continuous laryngeal sound—in other words to allow the air passing between his vocal cords to escape by the nose; the essential sound of *m* was the result. I need scarcely add that, not only in the first, but in every other, case as soon as I had made him recognise that he had really articulated the letter-sound which I was teaching him, I then endeavoured to make him associate its pronunciation with that of some prefixed or appended vowel, and in every case with considerable though not absolute success.

At subsequent visits I taught him by the same process (I need not go further into the details) the lingual and guttural consonantal sounds. And thus in the course of four or five lessons, each of about ten minutes' duration, given within less than a fortnight, he acquired the power of articulating all the simple vowel-sounds and all the simple consonantal sounds, including those of *th* in 'thing,' and *th* in 'this,' *ng* in 'tongue,' *sh*, and *z* in 'azure.'

On December 4, he wrote on his slate, 'I don't feel very well this morning. I got a fall last Thursday night (accidentally), one of my crutches slipped, which gave me a severe shaking. My back is rather painful, and a great deal of pain in the head from the fall. Can pronounce all the vowels except *i* and *u*. Can't pronounce *g*, *h*, *j*, *q*, and *w* and *y*.' The truth, however, was, as is stated above, that he could pronounce all the elementary articulate sounds, but he could not yet combine sounds which he had not been taught to combine, and he could not therefore utter the English names of the letters which he here enumerated. It is scarcely necessary for me to point out that *i* and *u* represent compound vowel-sounds, and that each one of the other letters which follow is made up of at least three distinct literal sounds.

At the end of a fortnight from the beginning of my treatment I began to teach him to combine letters. Selecting certain consonants I made him pronounce them in conjunction with the various vowel-sounds. I found little difficulty now in making him do this; and I recommended him to practise new combinations for himself, for which purpose I suggested that a child's spelling-book might be useful to him; and he got one. I think it was at my next visit, three or four days afterwards, that he greeted me for the first time with a somewhat slowly and carefully uttered 'Good morning, Sir.' His progress was now marvellous in its rapidity. Within another ten days he was able to talk well, except that perhaps he spoke somewhat slowly, and evidently had to give more care and thought to the pronunciation of his words than healthy people need to do. He improved subsequently in readiness of speech, but even when he left the hospital spoke perhaps a little slowly and carefully. This manner may, however, have been natural to him. It may be worth while to add that when his speech was restored he spoke with his original American accent.

The lessons which I gave him were, as I have shown, few and short. But he himself, as soon as ever he had appreciated the fact that he had organs capable of evolving articulate sounds, supplemented my instruction with the most zealous practice. Thus the vowel and consonantal sounds which he uttered somewhat imperfectly during a lesson were learnt accurately by my next visit; and as soon as he had begun to combine sounds, he practised them in various combinations with great industry; the sister of the ward, and nurses, and more especially three or four intelligent patients who were friendly with him, and interested in his progress, giving him constant assistance. Before he could articulate at all, and in the earlier period of his recovery of articulation, he often remarked

that there 'was a sort of difficulty he could not explain' which prevented him from speaking; and always during his earlier attempts he complained that a pain at the back of the right side of the neck and head attended his attempts—pain apparently of the same kind and in the same place as that which had formerly attended the act of mastication. This pain disappeared, however, before long.

I have hitherto described the patient's progress while in the hospital, in relation to the recovery of speech only; and this indeed may be regarded in one sense as merely a little by-play; for he was never (except for a day or two) under my medical care. During his residence in the hospital he was treated variously with iodide of potassium, quinine and iron, hypophosphate of soda, and quinine, and at one time had the crown of the head shaven and bran poultices applied to the part. I do not think, however, that any of these measures had the slightest influence over his recovery of articulation; and they certainly do not seem to have had any effect upon his paralysed limb. For at the end of December, by which time his speech was perfectly restored, the limb was still, according to his statement, numb, and it was so feeble as to be of no use to him; he could move it slightly, but his power over it was far too little to permit of its use in progression; and he still (as he had done all along) occasionally fell when walking with crutches. On January 6, he came for a few days under my care. His limb was still apparently as useless as on admission, and, as galvanism had not yet been used for it in our hospital, I ordered it to be faradised daily. Under this treatment he rapidly regained power in the leg, and in a week could walk without the aid of a stick; indeed he felt so well in all respects that he considered he was able to resume his occupation, and wished to leave the hospital for that purpose. I urged him to remain a little longer, but notwithstanding my wishes he left on January 18.

Remarks.—The case which has just been recorded is one of an exceedingly rare class. Trousseau, who includes all forms of loss of speech under the name 'Aphasia,' says: 'There is, however, a form of aphasia in which the intellect remains unaltered. Memory is good, the patient writes easily, and expresses his thoughts correctly in writing as educated deaf-mutes do. This form is very rare, and it has seemed to me to differ so widely from the other, that I have thought myself warranted in regarding it as a distinct

variety, particularly as in all the cases of the other form of the disease, the inability to write is proportionate to the inability to speak. The following case struck me the most: I received one day in my consulting-room a carrier of the Paris Halles, very young, and having the appearance of a man enjoying excellent health. He made signs that he could not speak, and handed to me a note in which the history of his illness was detailed. He had written the note himself with a very steady hand, and had worded it well. A few days previously he had suddenly lost his senses, and had been unconscious for nearly an hour. When he came round, he exhibited no symptom of paralysis, but could not articulate a single word. He moved his tongue perfectly, he swallowed with ease, but however much he tried he could not utter a word.' . . . 'He was ineffectually galvanised for a fortnight; but without any special treatment, he completely recovered his speech five or six weeks after the invasion of the complaint. It is very remarkable, however, that during the whole course of this singular affection he could manage all his affairs, continue them even in a certain measure, by substituting writing for speech.' Dr. Bastian, in his excellent article 'on the various forms of loss of speech in cerebral disease,'¹ while distinguishing (as others have done) those cases in which the defect is amnesic or due to impairment of memory of words (either from paralysis or inco-ordination) from those cases in which the defect is ataxic, or in which, while the memory of words remains, the mechanism by which this 'incites the automatic acts of speech' is interfered with, divides the latter class of cases into three groups. In one of these groups, to which he limits the application of the term 'aphasia,' there is loss of power both of speaking and of writing, in another to which he assigns (as does Dr. W. Ogle) the name 'agraphia,' there is loss of power of writing only, and in the third, to which he suggests the word 'aphemia' should be limited, there is loss of power of speaking only. My own case is obviously a typical example of aphemia in the sense in which Dr. Bastian employs that word. He speaks of these cases as forming 'a very remarkable class, the examples being very scarce;' and that

¹ *British and Foreign Medico-Chirurgical Review*, Nos. 85 and 86

they are very scarce is obvious from the fact that the only true case of the kind which he cites, or refers to, is the case of Trousseau's quoted above.

In addition to the interest which attaches to my case as being a typical case of aphemia, is the interest it acquires from the fact that the power of articulation, and consequently the power of speech, was regained under the influence of instruction. That mode of treatment does not seem to have been employed in Trousseau's case, and the patient recovered his speech perfectly in the course of a few weeks, in consequence doubtless of the restoration to health of the mechanism by which the mind 'incites the automatic act of speech.' And it was employed with only slight success in a case which Dr. Bastian quotes from Dr. Osborn. But Dr. Osborn's was not an uncomplicated case of the affection; moreover, I think that a perusal of it will show that it was only towards the close of the case, as recorded, that the proper method of instruction was hit upon, and how far it was then carried out and with what success does not appear. The fact is, of course, that the articulation of words in speech is a purely automatic phenomenon. The utterance of the appropriate words follows our thoughts without any attention being needed or paid to the complex movements by which their articulation is effected; indeed the bestowal of attention upon these movements is apt to interfere with their perfect performance. The child learns to speak (on the same plan that he learns everything else) not by first painfully mastering the elementary sounds of speech and then laboriously combining them into words, but by copying automatically the complex sounds—words and sentences—which he hears; and thus by degrees he acquires a language, without acquiring any knowledge of the mechanical processes by which he effects its utterance, and doubtless in many cases without ever having the slightest suspicion that every shade of sound he evolves requires for its evolution a special and complex arrangement of a highly complicated apparatus. It is not difficult to understand how, to a person thus educated, an obstruction to the channel through which the mind, willing to express its thoughts in words, is accustomed to incite the automatic acts on which words depend,

annuls their utterance. He wills to say a word, but the ganglionic centre which presides over the organs of articulation (used as organs of articulation), which has hitherto acted as his agent in this matter, and has had, so to speak, the sole management and control over it, fails to act for him ; he is ignorant how otherwise to produce articulate sounds, and is dumb. You find that he can move his lips and tongue freely, and you tell him to repeat after you a short and easy word, it may be a single letter ; he again directs his agent to perform the necessary acts, but again there is no response, and, to your surprise perhaps, and even more to his own, his lips and tongue remain motionless and he is still dumb. And so, not appreciating his condition and believing himself to have lost the faculty of speech, he is likely to remain, unless either the obstructed channel be restored, or he be taught to speak through the intervention of some other agency. But the production of articulate sounds is the result of a mere mechanical arrangement of the parts concerned ; and if the organs be placed in certain positions and breath be then emitted through them, certain articulate sounds must necessarily be evolved. The aphemic patient hears and understands, and can read and write, and he can execute with his lips and tongue, and associated parts, all possible combinations of voluntary movements, and he can necessarily therefore, when instructed how to do it, arrange these organs in all the positions which are essential for the utterance of the various elementary sounds. He cannot say the words which stand for the letters *s*, *v*, *l*, and the like, for reasons which have been considered ; but he can, if shown how, put his tongue and his lips into the positions for their utterance ; and having put them into those positions, and being made to emit vocalised or unvocalised breath, cannot then fail to sound them. It was, as has been seen, thus that my patient learnt. He had been nine months entirely speechless, believed himself to be hopelessly dumb, if told to repeat a word had apparently no conception of how it was to be done, and stated in fact that a something which he could not explain seemed to prevent him ; and at the time when I first took him in hand he had made no advance whatever towards the recovery of articulation. Yet at the very first lesson

he was, to his own astonishment and gratification, made to utter articulate sounds which his ear recognised as articulate sounds. The first step having been gained, everything else was, as might under the circumstances have been anticipated, comparatively easy. And no sooner had he learnt how to produce all the elementary articulate sounds, than the power of uttering words, the capability of speech, flashed upon him almost instantaneously—as it were by magic. It might be asked how it was that having forgotten how to speak, yet having the voluntary use of the organs which are employed in speech, he did not recover language as a child learns language. But to this I think it may be replied that adults don't acquire language intuitively as children acquire it; they don't begin by uttering odd combinations of sounds as substitutes for words and phrases; they begin with the elements and mount gradually upwards. The child's method of learning language was unnatural to him; besides which, as he could not utter the words which seemed to him on the tip of his tongue, restrained apparently by some mysterious influence, he came to the conclusion that he was mute, and on these grounds probably did not persist in making noises with his mouth which his ear would tell him were inarticulate, and in which he would doubtless fail to recognise the glimmerings of speech which they really contained.

I append the following notes of B.'s case which were given him in Singapore; for, though differing a little in some details from its early history as furnished by himself, they confirm its substantial truth.

He was admitted into the hospital at Singapore on March 20th.

'State on Admission.—Left leg paralysed. Is deaf and dumb. Complains of pain in the left leg, which is rather tender to the touch, though powerless; pain across the temples, extending to the vertex of the head. Is much depressed in spirits. Bowels confined.

To have an enema. Ice to head. R Liq. ammon. acet. ʒj., Spt. æth. nit., ℥xv., Mag. sulph. ʒj., Aq. ad ʒj. Misce ft. mist. capiat secundis horis.

'March 22nd.—Feeling better; pains still in left leg; deafness continues; bowels moved; somewhat cheerful.

'To have the leg fomented and soap liniment frictions; to have 3 grains of quinine at noon, and 5 grains of carbonate of ammonia added to each dose of the mixture.

'27th.—Expresses himself (in writing) to feel very well this morning: head feels easy, and the leg does not seem to pain so much. "I can also hear if you only speak loud; I feel as if there was something in my throat, a choking feeling."

'April 1st.—Has for the past few days been having an application of the galvanic battery over left leg, back of neck and throat. This morning complains of head and leg paining him much; does not hear so well this morning; complains of the galvanic battery leaving a dim stupid sensation in his head, especially across the forehead.

'2nd.—Much the same, though the pains complained of have been relieved.

Mist. strych. \mathfrak{z} j. after breakfast and tiffin.

'5th.—Feeling better this morning; head confused; throat painful; "able to move my leg a little easier, otherwise I feel stronger and livelier." Has continued to improve in left leg; gaining power, and not so painful. Hearing much improved; can hear the ordinary voice of any around him. General health good. Spirits cheerful. Still unable to articulate. A slight moan is all that can be uttered, but this causes pain in the head (vertex).

'22nd.—To discontinue the strychnine mixture, and to have potass. hypo-phosphat. \mathfrak{z} ss., tinct. gent. \mathfrak{z} ij., aq. ad \mathfrak{z} vj. Misce ft. mist. cap. \mathfrak{z} ss. ter die.

'June 9th.—B. has continued to improve; he is much stronger and more cheerful, but is still unable to speak; any attempt at articulation causes pain in the top of the head. He has gained a little power in the voice, that is all. He has more strength in the left leg, and more control over it.

'He is now leaving for England, and this brief epitome of his case is given him to guide any medical officer into whose hands he may next come. He has also had general tonics, shower-baths, and counter-irritants, and stimulating frictions of the affected leg.

'(Signed) H. L. RANDELL.

'Colonial Surgeon, Straits Settlement, Singapore.'

VII.

ON RECURRENT PALPITATION OF EXTREME RAPIDITY IN PERSONS OTHERWISE APPARENTLY HEALTHY.¹

THE subject to which I wish to direct attention is that of extremely rapid pulsation, occurring for the most part in intermittent paroxysms of variable duration, in hearts structurally and texturally sound, and in persons otherwise healthy.

That hearts may beat with the extreme rapidity with which I have found them to beat, is a fact which, I think, has been largely overlooked, and with which I, at any rate, had no practical acquaintance until within the last two or three years; and yet I feel sure, judging from my recent experience, that the condition which I am about to discuss is of frequent occurrence, and needs only to be looked for intelligently to be recognised in many persons who are regarded as merely nervous and liable to attacks of ordinary palpitation.

So far as I know, the literature of the subject was, until recently, limited to the report in the *British Medical Journal*, for the year 1866, of three well-marked cases, the first from the pen of the late Dr. Cotton, and the others respectively by Dr. James Edmunds and the late Sir Thomas Watson. Of these cases I need only say, that they almost accurately resembled the most striking and typical of the cases which are incorporated in this paper; that the cardiac pulsations during the paroxysms of palpitation were at a rate of about 240 in the minute; that in the intervals the patients appeared to be well and free from heart-disease; and that in Sir Thomas Watson's case (which proved suddenly fatal) the heart was

¹ *Brain*, July 1887 (with an additional case).

found to be soft and somewhat enlarged, but otherwise healthy.

The first typical case of the disease which I ever fully recognised was one which I saw in consultation with Dr. Wyman, of Putney, in the early part of 1885. The patient was a fairly healthy-looking young married lady, who had evidently been liable for some years to attacks of palpitation, and was free from structural disease of the heart. The attack in which I saw her came on suddenly, without apparent cause, and after a week left her as suddenly as it had arisen. Her pulse varied between 180 and 192 in the minute. A few weeks later she had a recurrence of palpitation, when the cardiac beats were counted at 246. What seemed to me at the time the most remarkable feature of her case was the apparent absence of distress. Had I not known that the patient's heart was beating with extraordinary rapidity, it would never have struck me, from watching her and conversing with her, that there was anything the matter with her.

CASE 1.—Paroxysmal hurry of heart of some years' duration.

Mrs. P., a married lady 30 years of age, was attacked about six weeks before I saw her with pleuro-pneumonia of the right side, from which she had apparently recovered completely at the end of about four weeks. A few days before my visit (April 5) she had taken a drive. This seems to have upset her; for on her return home she was attacked with retching, dyspnœa, and nervousness. The retching soon ceased; but the pulse was found to be beating with great rapidity (about 180 in the minute), and this rapid pulsation has continued. She has been kept in bed, complaining of fluttering in the region of the heart, slight dyspnœa and nervousness; but otherwise has appeared fairly well. When I saw her she was sitting up in bed, looking bright and cheerful, but pale and delicate. There was no obvious dyspnœa, although perhaps she breathed a little more quickly than normal, and no cough. The heart was beating regularly at the rate of 192 in the minute. It was not enlarged; and the sounds, which were short and sharp, were unattended with murmur. The lungs were healthy. There was no abdominal affection; the urine was free from albumen, and no anasarca was present. Her tongue was a little furred, and her appetite not very good. There was no goitre or exophthalmos.

The patient had been married for three years, and had no family. She said that formerly she was stout; but that for several years past she had been, as she now was, thin; and that she had been liable for some years past to attacks which seemed to her like that for which she was now under treatment. They came on suddenly, without cause, and after lasting for a few days subsided suddenly. She had consulted medical men, and had been told that she had heart-disease, and had been directed not to exert herself, and especially not to hasten up hill or stairs. She had never had rheumatism.

On this occasion the heart continued to act with extreme rapidity for a week, and then suddenly its beats fell to 110 in the minute, and shortly afterwards to 92. I saw her again on April 20. The pulse was beating at the rate of 92 in the minute, and quite regularly. There was no cardiac murmur, and she appeared to be, and expressed herself, as feeling perfectly well.

About a month or six weeks later she had another similar attack, in the course of which the pulse reached 246 in the minute. It was unattended with dyspnoea, and there was no rise of temperature.

My second case was admitted into St. Thomas's in July of the same year. It was that of a man between 30 and 40 years of age who had suffered from heart-disease ever since an attack of acute rheumatism eight years previously. He had obstructive and regurgitant aortic and regurgitant mitral disease, with hypertrophy and dilatation of the heart. There was reason also to believe that the arch of his aorta was dilated. He presented all the usual signs and symptoms of abundant aortic regurgitation. It appeared that for several months before admission he had been liable to attacks of palpitation; and during the three months he remained under my care he had many such attacks. They came on suddenly at irregular intervals, night or day, without obvious cause, continued for periods which varied between half an hour and thirty-six hours or more, and subsided suddenly. While in his attacks, he complained of feeling ill, faint, and weary; and his pulse ranged from 160 to 200 in the minute. In the intervals it varied from 80 to 100. He came under my care for the second time early in 1886, and remained in hospital for a period of four months. For the first two months he suffered, precisely as

he had done previously, from recurrent attacks of palpitation, after which I treated him for the first time systematically with digitalis and iron; and with the best results, for the attacks at once diminished, and during the last six weeks of his residence in hospital, he remained entirely free. He died shortly afterwards; but I have not been able to obtain any information as to the circumstances of his death.

CASE 2.—*Double aortic and mitral disease, and probably aortic aneurism; ascites; paroxysmal hurry of heart. Death.*

William N., a dealer, 34 years of age, first came under my care on July 30, 1885.

At the age of twenty-six he had a severe attack of rheumatic fever, and has never felt well since. A few months ago he began to suffer from palpitation, short breath, and cough, which often came on in severe paroxysms, and finally prevented him from doing his work.

He was an exceedingly pallid man, complaining of the symptoms above enumerated. The præcordial dulness was extensive. The heart was much enlarged; its apex beating in the 6th interspace, about three inches below, and an inch and a half to the left of, the nipple. There was marked pulsation over the whole of this area, and also in the inner part of the right second and third intercostal spaces. The action of the heart was regular, and attended with a musical systolic murmur at the apex, and a well-marked double murmur at the base. There was some crepitation at the lower part of both lungs. The cough was attended with a good deal of frothy expectoration. The urine contained a trace of albumen.

The patient remained in the hospital until October 31, presenting in a greater or less degree the symptoms above described, and suffering also from great distress and weariness, and not unfrequently from pain extending down the left arm. The most interesting phenomenon in his case, however, consisted in the frequent super-vention of attacks of palpitation. These came on suddenly, without definite cause, sometimes in the night, sometimes in the day, and ended suddenly, also without definite cause. They lasted from three-quarters of an hour to 36 hours or more at a time; and while present the rate of the pulse (which for the most part continued regular) varied from 160 to 200 in the minute. Most commonly it was about 180. The attacks came on irregularly, sometimes every day, occasionally even twice a day, and often at intervals of

several days. During them the patient felt ill, faint, and weary, but did not suffer from cardiac pain. He complained of dyspnœa, but the respirations were for the most part only about 32. He was liable to slight rises of temperature; but there was no obvious relation between them and the palpitation. In the intervals between his attacks the pulse varied from 80 to 100, was generally regular, and presented a well-marked aortic regurgitant character. Various remedies were given with the object of arresting the palpitation. But latterly nitro-glycerine alone was employed, in doses varying from $\frac{1}{100}$ to $\frac{1}{25}$ grain. This was thought to relieve him at times. But I am doubtful whether it had any real influence over the action of the heart.

On February 12, 1886, he was again admitted under my care. He had suffered during the interval from frequent attacks of palpitation, and latterly his belly and legs had become swollen, and he had had severe attacks of epistaxis. His abdomen was tapped on March 4, when 14 pints of serum were removed; on the 27th, when $12\frac{3}{4}$ pints were taken away; and lastly on April 18, when the amount withdrawn was 13 pints. After the tapplings the liver was found to be considerably enlarged. The removal of the ascitic fluid relieved the patient's breath, and rendered him generally more comfortable, but had no material influence over the attacks of palpitation.

These continued, in fact, without change of character up to April 18; they were just as severe, just as frequent, and just as irregular in their occurrence and duration as they had been during his former stay in the hospital. On April 18, with the object partly of benefiting the dropsy, partly of influencing the attacks of palpitation, a mixture, containing ten drops of tincture of digitalis, five grains of tartrate of iron and calumba, was ordered to be taken every six hours. This was five days before the last of the three tapplings above mentioned. During the next week or two there were two or three short attacks of rapid action of the heart, and then they ceased altogether; so that during the remainder of his stay in the hospital, a period of about six weeks, he continued quite free from them. Moreover, although for a short time the ascitic fluid seemed to be re-accumulating, it soon ceased to collect; and when he left the hospital there was little or none remaining. Nevertheless, for some two or three weeks after the last tapping, although not suffering from palpitation, he was extremely ill, very weak, very drowsy, inclined to ramble at times, and had several severe attacks of epistaxis. Then he improved somewhat, and though weak and ill when he left the hospital, was, on the whole,

a good deal better than when he was admitted. During both his periods of residence in the hospital his urine contained more or less albumen, and his temperature varied from 97 to 101. In the intervals between the attacks of palpitation his pulse ranged from 80 to 110, and was apt to be irregular. And after the last tapping his respirations were, on the whole, more rapid than they had been previously, and often rose to 40 or even 50 in the minute.

He left the hospital on June 7, apparently much better than he was when admitted, but still very ill. He died at home three or four weeks later.

My next case was that of a lady, 49 years of age, who for several years had had a largish goitre; but, so far as could be ascertained, had not suffered from palpitation, or other symptoms of Graves's disease. When I saw her she had been complaining for two or three weeks of dry cough, dyspnoea, and great rapidity of heart's action. It had been ascertained on several occasions that the beats were about 200 in the minute. At the time of my visit she was in bed with the above symptoms, but in other respects seemed to be in fair health. The heart (the apex of which was somewhat displaced to the left) was beating at the rate of 180 in the minute, and somewhat irregularly. Its sounds were free from murmur, and no evidence whatever of disease either in the thorax or in the abdomen was discovered. I saw her again three days later. She was then very restless and ill, and her cardiac pulse, which had been 240 the night before was now about 220. There was still no discoverable visceral disease. The next day her urine was found for the first time to contain a good deal of albumen. She died the following night. I am inclined to think that the goitre in this case was a mere accident of the case, and did not imply the presence of Graves's disease, and to suspect that the attack in which the patient died was only the last of an unrecorded series of such attacks.

CASE 3.—*Goitre; rapid action of heart; restlessness; albuminuria. Death.*

Mrs. P., aged 49, a patient of Dr. Wyman's, of Putney, has, on the whole, had good health; but for several years has had a largish goitre, which is said latterly to have caused some difficulty

of swallowing. She has been treated with iodide of potassium, and, it is believed, with benefit. There has never been exophthalmos, or stridor, or, so far as is known, attacks of palpitation.

Her present illness began two or three weeks before I was asked to see her, on February 16, 1886; and has been characterised by cough without expectoration, shortness of breath, and great rapidity, with some irregularity, of heart's action. Her illness, however, has not prevented her from performing her accustomed household duties; and it was only yesterday that, by Dr. Wyman's orders, she took to bed. Her pulse has been several times counted, and found to be about 200 in the minute. Her appetite has been poor, but she has slept well, and her urine has been free from albumen.

She was a healthy-looking woman; and, as she lay in bed, seemed free from dyspnoea and all other kinds of distress. The goitre was rather large. There was no lividity or anasarca. Her tongue was clean. She complained of cough, but it was not severe and there was no expectoration. No evidences of disease were discovered in the lungs. The præcordial dulness was rather large, and the heart's apex was thrown a little outwards, but there was no undue prominence. The pulsation was somewhat diffused. The heart was beating slightly irregularly, at the rate of 180 in the minute. The sounds were short and sharp, but free from murmur. No pericardial friction; pulse weak, somewhat irregular. No evidence of abdominal or renal mischief.

I saw her again three days later (the 19th). She was then very ill. It appeared that she had been getting worse, and that since yesterday she had been extremely restless, rarely sleeping, and then only for a few minutes at a time, and constantly rambling. There was no sickness; but she had taken little food, and the bowels had been somewhat confined. Her evacuations had been passed consciously. The pulse last night had been 240. The urine had been free from albumen; the temperature a little above the normal. She was now exceedingly restless, tossing her limbs about, and shifting her position constantly. She was rational, but her articulation was very indistinct. Skin dry, but not hot; tongue thickly coated. Occasional cough, but no marked difficulty or acceleration of breathing. Chest resonant, breath-sounds healthy. Præcordial region as before. No pericardial or cardiac murmurs. Action of heart somewhat irregular, and varying from 200 to 220 in the minute. No paralysis, no affection of pupils, no fits—nothing, in fact, to point to cerebral mischief. Goitre unchanged.

I heard the next day that the patient was still extremely restless; that her pulse continued about 220, and that she seemed

sinking. The urine now was found to contain a considerable quantity of albumen. She died either that night or the next morning early.

The case of Miss J., which follows, is one of remarkable interest. She was a highly intelligent and active-minded woman, and for three or four years had occupied a post which not only involved continuous official labour and much responsibility, but required her two or three times a year to make a tour of inspection embracing some of the larger provincial towns. Her attacks of palpitation began about the year 1870, when she underwent a long spell of hard work and anxiety which was followed by a long period of sleeplessness. The first attack came on quite suddenly, and after half an hour ceased suddenly. Subsequently she had many such seizures, coming on at variable intervals, often of many months, and usually without apparent cause. They increased latterly, but rather in duration than in frequency. The attack immediately previous to the one in which I attended her, came on towards the end of 1885, and lasted for six weeks, during the whole of which time her cardiac pulse was regular, and varied from 200 to 260 in the minute; and she continued to do her official work, and generally to act as though she were a healthy woman. Her next attack came on on the 10th or 11th of April 1886, and ten days later I saw her for the first time. She was then suffering from a troublesome cough, and complaining (as was usual during her attacks) of fidgetiness, and of feeling in a hurry; but otherwise she seemed well, and was performing her official duties as usual. Her cardiac pulsations had ranged between 200 and 250 in the minute, and at the time of my visit were 216. There was no obvious enlargement of the heart; its sounds were free from murmur, and no evidence of disease was discovered either in the other thoracic or in the abdominal organs. At the end of five weeks the pulse suddenly fell to the normal, and for five days continued normal. On the 10th of May, without warning, the palpitation recurred; and, while still suffering from it, she determined to go on one of her periodical tours of inspection. She was feeling very poorly when she left London on the 1st of June; on the 4th

of June, for the first time in her life, her legs became swollen ; on the 9th, she reached Liverpool, and feeling very ill, telegraphed for her brother-in-law to fetch her. Nevertheless on that day she spent six hours in inspection. It only remains to say that from this date she suffered from anasarca, pulmonary apoplexy and pleurisy, that the rapid action of her heart continued, and that finally she died, with the usual symptoms of cardiac inadequacy, on the 10th of July.

It is remarkable that, excepting during her last attack of palpitation, which was unusually prolonged and doubtless aggravated by persistence in the performance of laborious work, Miss J. suffered little while her heart was beating with extraordinary rapidity, and was able to take long walks, and to perform systematic and laborious mental and bodily work. She usually complained of discomfort and worry when the palpitation came on, but soon apparently became reconciled to it, only feeling somewhat irritable and restless. It is remarkable, too, that there was no clear evidence even of cardiac hypertrophy or dilatation.

CASE 4.—Paroxysmal hurry of heart and restlessness of fifteen years' duration. Death, with symptoms of cardiac obstruction.

I first saw Miss J., aged 40, with Dr. Floyer on April 21, 1886. She had then been suffering for ten days, and was still suffering, from an attack of palpitation.

Her history was as follows :—She had had good health down to the time of the Franco-Prussian war, when, owing to circumstances on which it is needless to enter, she was for some time overworked and had much responsibility thrown upon her. Following on this she suffered for some months from sleeplessness, and had to take chloral. It was about this time that she had her first attack of palpitation. It came on suddenly and left her suddenly, lasting for about half an hour. This attack was followed by others, which seized her at irregular but long intervals, often of many months. These have increased upon her of late, but rather in duration than in frequency. They have come on without warning, and for the most part without obvious cause ; but she thinks they have sometimes been induced by dancing and excitement. The last attack occurred in the latter part of last year, and continued day and night for about six weeks. Like all its predecessors, it began and ended

suddenly. The palpitations have always been a cause of distress to her; but have never prevented her from taking exercise or performing whatever duties she has had to perform. For the last three or four years she has been a Government inspector of needlework, and her employment has obliged her to spend some hours daily in official work at Westminster, and periodically to visit various towns in England for the purpose of inspecting the needlework at certain schools; and she has performed these duties thoroughly, even while the attacks of palpitation have been on her, and apparently without injury. What has been the rate of the heart's contractions during the numerous attacks she has experienced I cannot say; but in the last one it certainly varied between 200 and 260 in the minute. The higher number was more than once counted by Dr. Sharkey, who was seeing her at that time. She says that she always feels much distressed when an attack first comes on; but that afterwards she gets accustomed to it, and the distress diminishes; and that she cannot lie on her back or left side on account of the unpleasant throbbing of her heart; but otherwise is unconscious of its rapid action. Her main complaint is that when the palpitation is on her, she always feels irritable, fidgety, and in a hurry, as if (to use her own expression) she was impelled 'to do three days' work in one.' She has not been troubled with shortness of breath. She has never had rheumatism, chorea, enlarged thyroid or exophthalmos. She has not been hysterical, and the catamenia have been regular.

Her present attack, as has been stated, came on suddenly ten days ago, and has continued ever since, her pulse ranging the whole time between 200 and 250 in the minute. She has had an irritating cough upon her for some days, which seems to have added to her discomfort; and consequently for a day or two she has remained at home.

She was a healthy-looking woman, apparently not suffering much distress; and indeed no one to look at her or to converse with her would have thought there was anything the matter with her. There was no lividity or puffiness of face, no distress of breathing. Now and then, however, she had a rather violent paroxysm of coughing, attended with little or no expectoration. On examining the chest, the heart was found to be beating at the rate of 216 in the minute, and regularly. Its sounds were short and sharp, and quite free from murmur. The apex of the organ was not displaced, and the præcordial dulness was not enlarged; but the pulsation of the heart was diffused. The lungs were resonant and the respiratory sounds were normal. There was no sign of abdominal affection.

The urine was free from albumen. She was eating and sleeping fairly well. I may mention here that she was a singularly bright, intelligent, and well-informed, woman; and not only took great pleasure in her official duties, but was generally well-informed, and could talk sensibly and pleasantly, and with piquancy, on many subjects.

The next time I saw my patient was on May 3. I called on her at her office late in the afternoon. She had been performing her daily duties ever since I last saw her; and now, having been at her post fully employed from an early hour in the morning, was preparing to leave. She looked well, conversed freely and without difficulty, and said that she felt well but for the feeling of unrest, and the impulse to hurry, which were always present when her heart was acting rapidly. The heart was beating at the rate of 208 in the minute; and had been going on thus without intermission for twenty-two days. She still had a little cough.

I did not see her again until May 30. I learnt then that she had awoke on the morning of May 5, with her pulse at 120, and feeling quite well; that in the course of the day the pulse had fallen to its normal rate, varying between 70 and 80; and that for five days she continued absolutely healthy. This subsidence of the rapid cardiac action was not due to any obvious cause. She had been working hard and sleeping badly down to the very moment of its occurrence. On the 10th, without manifest reason, the morbid action of the heart recommenced suddenly, and it has continued ever since.

She was not feeling well at the time of my visit; she had been sleeping badly, her appetite had been poor, she had occasionally been retching in the morning, and she had felt weak; moreover she had been suffering from cough. But she had been doing her work thoroughly, and contemplated starting on a visit of inspection to Durham, Liverpool, and some other towns. Her heart at this time was beating regularly, and at the rate of 232 in the minute. There was no murmur; the sounds were quite distinct; but there was scarcely any interval between the first and second. The pulse was weak, and could not be counted at the wrist. Her breathing was quick, but I was unable to determine its rate because it always underwent unintentional modification when I tried to count it. But she did not complain of dyspnoea, and spoke as usual freely and without difficulty. There was no lividity or anasarca. The lungs were normal.

On June 1, she started alone for the North, as she had intended, and visited, amongst other towns, Durham and, lastly, Liverpool. She felt ill when she left London, and continued feeling ill during

the whole of the time she was away. She suffered from a noisy, distressing, and paroxysmal cough. On June 4, for the first time in her life her legs became œdematous, and the œdema increased during the rest of her journey. On the 9th, she spent six hours in inspecting a school at Liverpool; but she did it with difficulty, and in the evening was brought up to town by her brother-in-law, who had been sent for from London.

I paid her a visit on the 10th. She was then extremely ill. Her breath was short; her cough (unattended with expectoration) was very troublesome and violent; she complained of much pain in the præcordial and epigastric regions and across the lower part of the back. Her tongue was clean, but she had loathing of food and frequent sickness; no affection of the fauces could be discovered; the lungs were resonant, and the breath-sounds normal; the heart was beating regularly and without murmur, at the rate of 208 in the minute; there was tenderness below the ribs in the hepatic region, and apparently slight enlargement of the liver; and the urine was scanty; her legs were œdematous, and she perspired profusely.

Afterwards she passed a very restless night, suffering much from cough and dyspnoea, and from præcordial and epigastric pain. And when I saw her on the afternoon of the 11th she was much worse than I had yet seen her. She was perfectly sensible; but the præcordial pain and the distress were so great, her breathing was so difficult, each recurring paroxysm of cough was attended with so much aggravation of her sufferings, and she was so collapsed, that her life was believed to be in imminent danger. Her pulse was regular, and 240. There were no abnormal cardiac or respiratory sounds. A few whiffs of chloroform gave great relief to her cough; and in the belief that her sufferings were largely due to over-distension of the right side of the heart and to congestion of the liver, twenty leeches were applied to the præcordial region. These bled freely, and gave her great and immediate relief.

When I visited her on the 12th, I found that she had had a fairly comfortable night, and that she continued much easier. But she was very weak, had occasional attacks of dyspnoea, her cough, though reduced in severity, continued, and her legs were still anasarcaous. She did not complain of palpitation, but her heart was beating 240 in the minute. Her respirations were 40. The urine, for the first time, was found to contain a little albumen, but no casts were discovered. The chloroform still relieved her cough. During the next day or two there was no very great change in her condition on the whole; she had fairly good nights, owing probably to the subcutaneous injection of morphia; her cough was better, but

her appetite was very poor, and at times she went off into an alarming state of collapse.

On the afternoon of the 14th she was attacked with agonising pain in the region of the heart—so severe that she was constantly clutching at the left breast with her hand, rocking herself to and fro, and crying out and groaning. She was very pale and ghastly-looking, but not distinctly livid. The pain was continuous, was much like that she had suffered from previously, and did not appear to be true angina pectoris. The inhalation of nitrite of amyl was had recourse to, however, and with some degree of benefit. Chloroform was subsequently employed. And between them, these remedies and the application of dry mustard to the chest gave considerable relief. During this time her pulse was 208, and her respirations 40; and for the first time I detected a little crepitation at the base of the left lung. Her temperature was 100·4°.

About 7 p.m. Dr. Floyer gave 30 grains bromide of potassium, and at 7.40 injected one-eighth grain of morphia, after which she had some sleep. About 9.30 she awoke, and felt what she termed a 'lilt' in the region of the heart, or as if 'one of its cogs was broken;' she became at the same time more faint than she had ever felt before, and thought she was dying. Her sister came to her at once, and found her almost insensible and perfectly quiet, with cold extremities and imperceptible pulse. A minute or two later her brother-in-law arrived. She had already rallied somewhat; but she was still much prostrated, her hands were cold and clammy, and her surface generally perspiring profusely. Her pulse had fallen to 136. She soon recovered from her collapse, and subsequently passed a comfortable night.

On the next day, the 15th, she was much better than she had been for some time. She had little or no distress of any kind; her appetite had improved; her cough had almost subsided; she had no pain; she looked bright; her pulse (which could be easily counted at the wrist) varied between 128 and 132; the temperature was 99°; and the urine (which had a specific gravity of 1008) was free from albumen. I thought, also, that the dropsy of the legs had diminished.

From this time down to the evening of the 23rd the improvement seemed to be maintained, if not to progress. She slept fairly well, and for the first time since her journey to the North was able to lie down; her appetite improved; her pulse varied from 112 to 128; and she 'felt at peace.' Also the dropsy seemed to be diminishing. But her cough became a little more troublesome; there was some crepitation at both bases, and her temperature was

febrile, on one occasion rising to 102° . On the 23rd she had seemed as well as she had been during the previous few days. In the evening she took 20 grains of chloral, and slept comfortably for an hour or two. Then she woke up suddenly with a severe stitch in the right side of the chest; shortly afterwards had a very severe and painful attack of coughing; and while it was in progress felt a sudden throb in the region of the heart. The pulse at once jumped to 180 or 185 in the minute, and all the old sense of nausea, distress, and hurry returned. When I saw her on the afternoon of the 24th, she looked ill; her tongue was coated, and her appetite gone; she still had a stitch in the right side, and was breathing 40 in the minute; and her pulse varied between 200 and 208. There was no dulness on percussion over the lungs, but loud pleural friction was audible over the whole front of the right side. Her temperature was 100° . Ten leeches were applied to the affected side, and much relief to her symptoms ensued.

For the next fortnight there was no material change in her condition, excepting that during the whole time her cough, which was troublesome, was attended with hæmoptysis. The blood was mixed with mucus, was variable in quantity, but never abundant, and generally brownish or rust-coloured. It was evidently the hæmoptysis of pulmonary apoplexy, to which the pleurisy also no doubt was due. The pain and friction in her right side subsided, and the sickness and loathing of food diminished. But her pulse continued at the rate of 208 in the minute; her breathing was somewhat rapid; and it was thought there was a little fluid in the left pleural cavity; she complained at times of pains in the hepatic region; the swelling of the legs continued, although it was thought that it was gradually diminishing; and her temperature remained elevated by a degree or two. It may be added, that the action of the heart continued to be regular; that no cardiac murmur was ever detected; that there was no clear evidence that the organ was enlarged; and that the veins in the neck were not dilated.

I was sent for on the morning of July 10, and reached her at 1.30 P.M. I learnt that she had been attacked during the course of the previous night with extreme dyspnoea, which had continued. When I saw her she was moribund. She was sensible, but disinclined to answer questions; she was breathing quickly with rattles in her throat, moaning and frequently calling out for relief; her face was extremely pale, her extremities were cold and her pulse at the wrist could not be felt; but her heart was beating regularly, and still about 200 in the minute. She died at 3 P.M.

No autopsy was made.

My fifth case possibly does not belong to the same category as those which precede ; at any rate irregularity of cardiac action was as marked a feature as frequency of action, and the palpitation (so far as I know) was persistent. The patient was a spare, healthy-looking, elderly man, accustomed to field sports. He had had, he said, 'a sunstroke' a year previously, and had been liable to headaches ever since. Five or six months before I saw him it was discovered accidentally that there was something wrong with his heart. I saw him on two occasions, and on both found his heart beating irregularly at the rate of between 144 and 148 in the minute. He was not nervous at the time, had no cardiac discomfort, and indeed (excepting for the fear that he had heart-disease, as he had been told he had) felt and looked quite healthy. There was no evidence of enlargement of the heart, and no murmur. And he assured me that within the last few weeks he had run three miles in twenty minutes without distress.

CASE 5.—*Sunstroke (?) ; headache ; rapid action of heart.*

Mr. S., a spare, healthy-looking country gentleman, aged 65, accustomed to shooting, riding, and out-of-door exercises, called upon me on June 21, 1886. He has had excellent health down to a year ago, when on a very hot day, being on the sea-shore in command of a Volunteer Artillery Corps, he had what was called a sunstroke. What the symptoms were, beyond severe pain at the top and back of the head, I do not know. He does not appear, however, to have had a fit. This pain continued for three weeks, and since that time he has been liable to frequent recurrences of it. For some time past it has been a dull aching all round the head, but mainly on the left side, where it becomes acute when he sneezes or coughs. It is generally absent at night and in the early morning ; but it comes on after luncheon, and increases until bed-time. He sleeps well. He suffers slightly from indigestion, and his appetite is not very good. For two months in the early part of the year he was confined to bed with some inflammation of the right big-toe. This was, so far as I can make out, certainly not gout. He has suffered from occasional rheumatic (?) pains for years. It is stated that the medical man, who attended him when his foot was bad, detected 'slight valvular disease of the heart.'

At the time of his visit he was feeling very fairly well ; and I

should have regarded him as being healthy had not I found his heart beating at the rate of 144 in the minute, and somewhat irregularly. He did not appear to be, and said he was not, nervous; and, indeed, his cardiac pulsations underwent no change during the whole of our interview. He was not himself conscious that there was anything unusual in the action of his heart; had no uneasy sensation in the præcordial region, and no shortness of breath. He assured me, in fact, that within the last few weeks he had run three miles in twenty minutes, without the least distress. There was no evidence of enlargement of the heart, and no trace of murmur. All his other organs appeared to be perfectly healthy. His urine was free from sugar and albumen. I ordered him a mixture containing digitalis, iron, and ammonia, and some *cannabis Indica*, in the form of a pill.

On the 30th I saw him once more. There was no material change. His heart was beating at the rate of 148, and apparently quite regularly; but the beats at the wrist were unequal in force, and occasionally imperceptible, so that the radial pulse felt irregular. No cardiac murmur, no dyspnœa, no anasarca. He complained only of headache at times, lassitude and impairment of appetite.

Mr. C., my next patient, called on me about a week later than the last. He had consulted me in 1879, at which time his heart was acting with much irregularity and frequency. Although I could discover no definite sign of heart-disease, and he complained little of distress, I confess I took an unfavourable view of his case. He got well, however, while taking iron and digitalis. In 1883 I saw him again, when he was suffering from a similar attack; and he informed me that he had had such attacks occasionally ever since I had seen him. When he came to me in June, 1886, he looked, and on the whole felt, well; but his heart was beating with slight irregularity at the rate of 168 in the minute; and he furnished me with a written statement of the number and duration of attacks of palpitation he had had during the previous eighteen months. From that time until his death in June, 1887, the action of his heart continued irregular and rapid; and although never, so far as I know, attaining 200 beats in the minute, frequently, I believe, presented a rate of 300 beats per minute for a few seconds at a time. He continued apparently well (excepting for the rapid action of his heart)

until about a month before his death, when the ordinary symptoms of obstructive heart-disease came on.

CASE 6.—*Paroxysmal hurry and irregular action of heart of seven years' standing. Death.*

Mr. C., a short, healthy-looking commercial gentleman, about 38 years of age, called on me on the morning of June 28, 1886. He told me that he had been attacked on the 25th with violent palpitation of the heart, which had continued without intermission ever since. It came on without definite cause. He has felt poorly and disinclined for work, and indeed has taken a holiday from business, but has not felt seriously ill. On presenting himself before me, he looked, and spoke, and acted exactly as a healthy man might do; there was no obvious distress, no hurry of respiration, no congestion or lividity of face, and no anasarca. But his pulse was 168 in the minute, and slightly irregular. The præcordial dulness was not more extensive than normal; and the apex of the heart impinged in the usual place. The sounds were short and sharp, and quite free from murmur. There was no further evidence of disease anywhere.

About the year 1875 he had syphilis, followed by secondary symptoms, which have never recurred. In Sept. 1879, he was brought to me for consultation, by Dr. Johnstone English. Two months previously he had begun to complain of uneasiness at the pit of the stomach, supposed to be due to indigestion; this had continued, and it was discovered that his heart was acting with great irregularity. At the time of this visit to me he was pale, he complained of slight shortness of breath, his urine contained a little albumen, and his heart was acting very rapidly and with much irregularity. But I could discover nothing else. He had no cough, no anasarca, the lungs were free from congestion, the heart was apparently of normal size, and its sounds were unattended with murmur.

I was much puzzled about the case, for there was nothing whatever in the history (excepting the previous attack of syphilis) to suggest a cause for the symptoms, and there was nothing to prove the presence of organic heart-disease. It was agreed, however, that he should abstain from business (which he had been attending to hitherto) for a month, and should take iron and digitalis. He got apparently quite well in a short time.

In November 1883, he called upon me again. He told me he had had good health, excepting that at irregular intervals he had

had attacks of palpitation, which were always relieved by the medicine which Dr. English and myself had prescribed for him. He was now suffering from an attack. He complained of a little shortness of breath in going up stairs, and that he was conscious of the beating of his heart. But otherwise he felt well and he looked well. There was no anasarca. The heart was beating very quickly and irregularly, and no murmur was to be detected. No definite cause could be assigned for the attack, unless it was that he had been sitting up late. He was a bachelor, and I suspected his habits were irregular.

He told me on the present occasion (June 28, 1886) that he had continued liable to attacks of palpitation; and he furnished me with the dates and durations of his attacks since the beginning of 1885, as follows:—March 30, 36 hours; April 13, 33 hours; May 19, 18 hours; July 29, 57 hours; August 2, 4 hours; October 22, 46 hours; Nov. 25, 44 hours; Jan. 6, 30 hours; Jan. 31, 22 hours; Feb. 24, 12 hours. He could not always assign a cause for the attacks, but occasionally he thought they followed a little over-indulgence. They seemed always to be benefited by recourse to iron and digitalis.

He called upon me again on July 1. He had not been feeling well; but had slept well, and looked well. His pulse was beating between 120 and 130 in the minute, and was very irregular. On the 7th he again paid me a visit. He was much better; and ate, slept, and looked well. But he still complained of a little cardiac discomfort. The pulse was irregular, and beat 80 times in the minute; but, if it had been acting regularly at its generally prevalent rate, the beats per minute would have been 100. His normal rate of pulse, he told me, was about 60. He had been taking his old prescription. It was decided that he should take a few weeks' holiday on the Continent.

Termination of the Case.—The above case was written out for publication, together with several of the other cases, in July 1886. The patient has died since, and I here add a brief statement of his subsequent history.

After I saw him in July, he went to Zermatt for a month. He did not climb, but habitually walked three or four miles a day; and returned benefited in general health by his trip, but still with a rapid irregular pulse.

He came to me again in the latter part of February 1887, complaining of what he called indigestion. This seemed to consist mainly in an aching pain across the upper part of the belly, induced usually by taking exercise. The heart was beating irregularly, 160 in the minute; and I thought the abdominal pain was due to

hepatic congestion. On April 2 I saw him again. He was still complaining of abdominal pain; but in other respects felt, and he looked, well. I examined his heart very carefully on this occasion. Its action was very irregular, presenting two distinct alternating rhythms, each lasting for two or three seconds. In the one the heart was beating at the rate of 80 to 100 in the minute; in the other, at the rate of at least 240. There was diffused cardiac pulsation, but the præcordial dulness was not enlarged, the apex beat in its normal situation; there was no murmur, and the second sound at the left base was not accentuated. On May 4, he paid me another visit. He still had the epigastric pain, and for two days had been suffering from diarrhœa. I again examined his heart carefully. It was beating as before. But on several occasions during the brief periods in which it was beating most rapidly, I counted quite distinctly at least ten beats in two seconds; so that quite certainly, although the heart was not accomplishing more than about 160 beats in the minute, these were frequently at the rate of 300 per minute. After this he went to the Isle of Wight for a few days; but he became very ill there, and returned to London in the middle of May, suffering from great difficulty of breathing, general anasarca, and pain and tenderness in the region of the liver. He was livid, and his urine presented a trace of albumen. Dr. Wilbe was called in to attend him, and I met him in consultation. It is sufficient to say that, although the pulse on the whole became more slow and regular, the usual symptoms of obstructive cardiac disease continued; pleurisy with effusion on the right side, for which he had to be tapped on two occasions, supervened; and he died on June 9. No post-mortem examination was permitted.

My seventh case is in many respects the most interesting of the series. The patient was a young man, whose illness apparently dated from a strain twelve years before. There is some reason to believe that, ever since that time, he had had occasional attacks like that for which he came under my care. This had already lasted three months when I saw him; he had only been laid up, however, for six weeks, and latterly he had had some œdema about the ankles. During the earlier part of his stay in the hospital, his pulse varied in rapidity, often rising to 250 or 260 in the minute, and often presenting considerable irregularity of action, the beats at such times being apt to present sudden alternations of rate between 240 or 250 and half that number. At this

time he complained of sickness, aching across the upper part of the belly, and attacks of faintness, associated with lividity and dyspnœa; moreover, the slight anasarca continued, a little albumen appeared in the urine, and he spat a little blood. After a short time he was treated with iron and digitalis, and much benefit resulted; for although his cardiac pulse continued variable, at times quick and at times irregular, it became comparatively slow after a few days, and then fell to 50 or 60 in the minute. On one occasion it sank to 34. With this change the other symptoms of cardiac disease (anasarca, hæmoptysis, albuminuria, &c.) all disappeared, and he left the hospital, apparently well, at the end of a month. He thenceforth visited me at intervals as an out-patient. For a month he remained at home, and then resumed his occupation. While thus attending, he reported himself as being on the whole fairly well, but liable to attacks of faintness and palpitation. At the time of his visits to me his heart was often found beating at the rate of only 70 or 80 in the minute; but it was liable to be irregular in its action, and its rate would often rise suddenly to 250 or 260. On one occasion I counted 308 cardiac beats in the minute. On the whole the patient seemed to be going on well, but twelve weeks after he first came under my care, and at a time when he seemed to be in the enjoyment of good health, he died quite suddenly. It was noted during life that the heart was enlarged, and that always when it was acting at a healthy rate there was a systolic murmur at the apex. It was believed, however, that the valves were really healthy. At the autopsy the heart was found to be somewhat large and dilated; but the muscular tissue and the valves were healthy, and the ventricles were empty.

CASE 7.—Rapid action of heart. Sudden death. Autopsy.

Arthur W., a draper's assistant, 19 years of age, was admitted into St. Thomas's, under my care, on December 4, 1886.

He has had most of the ordinary diseases of childhood, but never any serious illness. When 8 years of age he took part in a paper-chase, but, after running across two or three fields, had to stop suddenly on account of a severe pain in the region of the heart.

He leant against a tree, and was speechless for some minutes; but was able to walk home. After that, running was prohibited for a time. He seems to have been liable to palpitation on exertion, especially on running up-stairs, ever since; but has otherwise had excellent health up to three months ago, from which time he dates his present illness.

He was then attacked with general aching pains and sense of poorliness, some cough, and shortness of breath. The symptoms persisted, but nevertheless he continued to follow his employment for six weeks. At the end of this time, his abdomen was swollen, and his legs were œdematous, and his palpitation and dyspnœa had increased. Latterly, too, he has complained of aching across the upper part of the belly, and of vomiting. He has had syphilis.

The patient was a tall, well-made, and, on the whole, healthy-looking man, complaining of sickness, cough with slight expectoration, shortness of breath, palpitation, and swelling of the lower extremities. His face was somewhat pale, with perhaps just a trace of duskiness, and there was slight œdema about the ankles; the thyroid body was not enlarged, and the eyes were not prominent. At the time of admission it was noted that the heart was beating between 240 and 250 to the minute; that pulsation could be felt and seen over the whole præcordial region, and that the cardiac sounds, which were quite distinct, were free from murmur. The præcordial dulness was somewhat extensive, beginning in the third interspace above, and extending slightly to the right of the sternum. The apex impinged in the fifth interspace about half an inch outside the nipple. The lungs were resonant, and, excepting that on deep inspiration some fineish crepitation was audible at the right base, the breath-sounds were healthy; expectoration slightly tinged with blood; respirations 32. There was no ascites or evidence of enlargement of abdominal organs. The urine had a sp. gr. of 1025, and was free from albumen. Tongue clean, appetite good, bowels regular, temperature normal.

Dec. 5, 2 P.M.—The patient has had several attacks of fainting during the morning. They are said to have been attended with dyspnœa and temporary stoppage of the heart, followed by over-violence of action. When I saw him the pulse at the wrist was irregular and impossible to count. On listening over the præcordial region the heart's action was found also to be irregular and very rapid. For periods of ten seconds or so at a time it was beating at the rate of 200 in the minute; then a strong beat would occur, and the pulse would drop for some seconds to a rate of 108; and again, after a short time, another throb would come, to be

followed by renewed over-rapidity. This alternation of very rapid and comparatively slow pulsation continued during the whole time he was under observation. On one occasion the beats fell to 84. At 4 P.M. he was complaining of feeling faint, and his heart was beating at 250 in the minute. His breath was short.

Dec. 6.—He had several attacks of sense of suffocation and faintness during last evening and night. They came on for the most part as he was dozing off, and prevented him from sleeping. About one o'clock in the morning he was in great distress; very restless, and wanting to get out of bed. He had half a drachm of aromatic spirits of ammonia and ten minims of tincture of digitalis given him, and became easier in the course of half an hour. The heart, when it was examined this morning, was beating at the rate of 164, and regularly. He has been complaining of nausea, and his feet are still œdematous.

Dec. 7.—Passed a better night; had no return of faintness. When examined this morning the heart's beats were 182 in the minute; at half-past three in the afternoon they were 208. Cough better, expectoration less; urine, sp. gr. 1025; no albumen.

Dec. 9.—Improving; but heart beating 224 in the minute.

Dec. 11.—Seemed better all yesterday; but became poorly during the night; was restless, and suffered from nausea, sickness, and diarrhoea. In the early morning the cardiac pulsations were 256; at 11 A.M. the cardiac pulse was declared by himself, and said by the sister of the ward, to be very slow. At noon, however, it had risen to 264. The respirations were then 28, and sighing; and the pulse could not be felt at the wrist; skin dry. *Midnight.*—Was sick at 4 P.M. During the evening has suffered from dyspnoea and palpitation; face now congested, lips and eyelids bluish; skin cool, perspiring; very restless and thirsty; heart's pulsations 256; respirations 28, and sighing; has spat a little bright blood. Ordered fifteen minims of tincture of digitalis.

Dec. 12.—An hour and a half after taking the digitalis he lost his lividity; felt easier, and inclined to sleep; but the heart's action remained rapid. Afterwards passed a fair night, and was tolerably comfortable in the morning. At 10 A.M. the cardiac pulse was 200; at 2 P.M. 220; the urine for the first time presented a trace of albumen. Ordered ten minims of tincture of digitalis, five grains of tartrate of iron, with infusion of calumba every four hours.

Dec. 14.—The patient is much better; no recurrence of dyspnoea or faintness, and no return of hæmoptysis; no albumen in urine. He says that he feels 'like his old self.' But the pulse is still rapid. In the morning the heart's beats were counted at

168. At 3 P.M. the heart was again examined; it was then acting irregularly; at one time at the rate of 168, at another at that of 192, with short intervals of uncertainty.

Dec. 17.—The patient has been going on well. The heart, however, has been acting variably, and, on the whole, rapidly. The cardiac beats have ranged from 120 to 132. At the present time the action is generally regular; but occasionally there are series of alternate strong and weak beats, the former only causing perceptible pulsation at the wrist.

Dec. 19.—Doing well, and feels well. Pulse 60, regular and soft, no anasarca.

From this date until he left the hospital on the 5th of January he continued to feel in his ordinary good health; all faintness and dyspnœa, cough and anasarca, had disappeared; his appetite was good, his urine free from albumen, and he slept well. The heart's pulse was usually regular and about 60 in the minute; occasionally, however, it went down to 52, or rose to 78. On one occasion (December 21) when I came into the ward the cardiac beats were only 34 in the minute: and the patient, though otherwise feeling well, complained of his heart thumping; consequently, the mixture containing digitalis, which hitherto he had been taking every four hours, was directed to be given thenceforth three times a day. On another occasion, while examining his heart (which was then acting regularly 60 times in the minute), I made him hold his breath for a few seconds, when immediately its action became irregular, presenting alternate strong and weak beats, at the rate (in combination) of 80 in the minute. The irregularity suddenly ceased after some seconds, and the rhythm and rate of movement returned to their previous condition.

When the frequency of the heart's action became permanently reduced, a soft systolic murmur was recognised at the apex. This had never been detected while the heart was acting rapidly, and was never observed to be absent when the organ was beating slowly. It was perfectly distinct, but was inaudible in the back. All the other cardiac sounds were normal; and the second sound at the left base was not accentuated.

During the times at which the heart was acting rapidly, there was diffused pulsation over the præcordial region. This I examined particularly on two or three occasions, and came to the conclusion that the impulse corresponding to the surface of the right ventricle was synchronous with the apex-beat. When the patient left the hospital, the heart's apex was situated just internal to the nipple. The radial pulse, excepting when the heart was beating slowly,

was always very small and very feeble, and seemed to be irregular. It did not admit of being counted.

During the patient's stay in the hospital, his temperature rose on one or two occasions to 99°, or a little more, and on one or two fell to close upon 95°. It usually ranged between 97° and 98·6°.

When he left he had gained flesh, and he looked, and (save for the presence of the mitral systolic murmur) might have passed for, a healthy man.

After his discharge on the 5th, the patient remained quietly at home for a month or so, and then resumed work as a linen-draper's assistant, travelling every day three or four miles backwards and forwards between his home and place of business; and he came to my ward as an out-patient on several occasions. The following are the subsequent notes that were taken.

Jan. 7, 1887.—Woke up at 6 P.M. yesterday morning with pain in the chest, and palpitation lasting about 10 minutes, and ceasing abruptly with a few forcible beats. Cardiac pulse counted immediately after he had walked upstairs to the ward, and found to be 264, and regular. A little later it had risen to 288. Shortly afterwards, having rested for a while, the pulse had dropped to 84. Half a minute later it was 116, but irregular. After lying down for a short time it was 72, and regular. No murmur heard while the heart was beating rapidly. Pulsation diffused over whole cardiac area. Ferri tart. gr. viij; Tinct. digitalis ℥x; Inf. calumbæ ℥j; t. d. s.

Jan. 18.—Has had many attacks of palpitation both night and day, and there is a little return of œdema. At the present moment he feels well, but the heart is beating irregularly. Tinct. digitalis ℥xv; ex haust.

Jan. 28.—On the 26th, when getting into an omnibus, had an attack of faintness, lasting a second or two. Thinks he lost consciousness. But he has, on the whole, been much better than he was previously to the last visit. Indeed, although his heart is beating at the rate of 220 in the minute, he is not conscious of palpitation, and feels and looks well.

Feb. 11.—The patient has continued much better. But while under examination he complained of palpitation, and of a slight sense of faintness. During his visit the heart was acting regularly on the whole, but with extreme rapidity; on several occasions I counted the beats at 256 in the minute, and on several they varied distinctly between 300 and 308. During the examination he was standing up, and made no complaint. But on looking at him, his face seemed rather dusky, and I made him lie down. After a short time I examined him while he was still recumbent, and found his

pulse at the wrist 64; the heart's beats being double that number, and alternately strong and feeble.

Feb. 18.—Has continued to feel well. Palpitation came on as he stood up to be examined, and the heart's beats were then 256 in the minute.

Feb. 23.—On this evening I got the patient to attend a meeting of the Neurological Society. He felt and looked perfectly well. His heart was beating regularly, and not rapidly, when he first entered the room. But soon the beats rose temporarily to about 240, and many of the members had the opportunity of verifying the fact. Several also of the members verified the presence of an apex systolic murmur when the heart was acting slowly.

After this he continued apparently very well. On the 26th (Saturday) he was engaged in business till midnight, and went home afterwards. The next morning (Sunday) he got up feeling quite well. He ate a good breakfast, and at one a good dinner; after which he went upstairs and played upon the piano. Suddenly the music stopped, and a fall was heard. On entering the room immediately afterwards, his friends found him lying on the floor dead.

Autopsy on the fourth day after death. Body much decomposed; some old pleuritic adhesions; lungs healthy; pericardium healthy; the heart was generally enlarged and dilated, and weighed $17\frac{3}{4}$ oz. Its muscular tissue was soft and flabby (doubtless from decomposition). The valves were perfectly healthy; all the cavities were nearly empty. Examined microscopically the muscular tissue showed no sign of degeneration.

There was no evidence of disease in any of the abdominal viscera.

The nervous centres were healthy, as were also the vagi and sympathetic cords in the neck and thorax.

Besides the above cases I have, since I have been on the look out for them, seen several which are obviously of the same class, but whose significance I should probably have formerly overlooked. The following two are interesting and typical:—

CASE 8.—*Paroxysmal palpitation, apparently due to strain.*

I was asked in February 1887, by a medical friend of mine, to see with him the wife of another medical man whom he was attending. She had had excellent health up to ten days before, and had certainly never suffered from undue shortness of breath, or shown any signs of cardiac disease. At the time referred to, she was

lifting a heavy box, when suddenly and quite without warning she experienced a sense of distress in the region of the heart, accompanied with faintness and oppression or difficulty of breathing. Since that time the attacks, lasting individually from a few seconds to a few minutes, have been of frequent occurrence, especially in bed. In bed, indeed, their constant and rapid recurrence has kept her awake all night. It was observed by her husband that during them her pulse was extremely irregular, and it seemed to him that (judging by the pulse at the wrist) the cardiac intermissions were frequently of several seconds' duration. I received this history (which was subsequently confirmed) as my friend and myself were driving to the patient's house, and suggested to him that most probably these intervals of apparent inaction of the heart were really periods during which the heart was beating with extreme rapidity, though also with extreme feebleness. When I saw her she struck me as a well-nourished, healthy-looking woman; she had no difficulty of breathing, and was not in any physical distress. Her lungs were healthy and resonant. The præcordial dulness was of normal extent, and the heart's apex in the usual situation. Its sounds were healthy, save for the presence of a slight and soft systolic murmur in the aortic area; there was no evidence whatever of dilatation or enlargement of the heart; or (excepting the murmur) of any disease either in the valves or in the large vessels. There was no anasarca, and the urine was free from albumen; the pulse was regular, and about 100 in the minute. But during my interview with her, periods of regularity and comparative slowness of cardiac action alternated frequently with attacks (varying in length between 5 and 20 seconds) of marked irregularity. These generally began with one or two powerful beats, which were followed by beats at the rate of between 200 and 250 in the minute. No pulse was perceptible at the wrist while the heart was acting thus rapidly. She had no pain at these times, but complained of a feeling of much distress. I saw the lady again at the end of April, and learnt that she had improved since my former visit; that for two or three weeks, while she was at the seaside, she had been almost entirely free from palpitation, and in her ordinary good health, but that during the last week or two (since her return to town) the attacks of palpitation had recurred. She had been taking liquor arsenicalis, but not iron or digitalis. She was at her best when I visited her, felt and looked well, was free from anasarca, had no dyspnœa, and the cardiac murmur, which I had recognised on the previous occasion, had disappeared. She had noticed latterly (as she had done before) that the palpitation came on chiefly at

night time, and when lying down; and she lay on the bed while I was with her, in order to bring it on. But only two or three slight attacks of irregularity, lasting for a second or two at a time, occurred. She stated that when lying down she could arrest or prevent the palpitation by placing a cushion or pad under the loins, so arranged as to cause the back to be strongly arched.

CASE 9.—*Paroxysmal palpitation of twenty years' standing, apparently due to strain.*

Mrs. F., aged 74, the widow of a medical man, consulted me a short time since, on account of some gastric disturbance, apparently of no great importance. But associated with this was some aggravation of symptoms which had troubled her for the last twenty years, and seemed to be those characteristic of the group of cases now under consideration. She stated that she had enjoyed quite good health up to about twenty years previously; when, on running upstairs hurriedly after lunch, she was seized with sudden severe palpitation and sense of extreme illness lasting for about ten minutes. Since that time she has been liable to such attacks, coming on without warning by night or day, not apparently induced by ordinary exercise, or by any other cause she has been able to recognise. The attacks have usually varied in duration between ten minutes and three or four hours. Originally she had probably no more than three or four in the year; but they have become more frequent, and now she rarely goes a week without one. Of late she has not felt so ill as she formerly did while the attacks are on her, but she is much more prostrate after them and for a longer time. Her pulse has been counted occasionally while the heart was palpitating, and found to exceed 200 in the minute. The pulse was of normal rate when I saw her, and regular. The heart's area of dulness was not unduly large; nor was the impulse of the organ unduly strong. There was slight roughness of the first sound at the apex, but no definite murmur.

A case also, which I evidently formerly misinterpreted, has recently come under my observation in consultation with Dr. Clothier:—

CASE 10.—*Paroxysmal hurry of heart of fourteen years' duration. Death mainly from bronchitis.*

This patient was an elderly lady living in Wales, whom I had known for 17 or 18 years. She had come up to London on a visit in the latter part of April 1887. She was then in her usual state

of health; but after a fortnight she seems to have caught cold, and to have contracted a sharp attack of bronchitis. I was asked to see her on the tenth day. At that time she was very ill, had much dyspnoea (her respirations being at the rate of 40 in the minute), had a frequent cough without much expectoration, and presented very slight anasarca. The urine was free from albumen. Her chest was resonant, but there was some crepitation at the base. The cardiac pulsations were irregular, and 224 in the minute, the sounds being free from murmur, and the organ (so far as I could make out) of normal size. The pulse at the wrist was imperceptible. Her temperature was normal, and she was quite sensible. The case went on badly, and she died three days later of a combination of asphyxia and debility.

Between 14 and 15 years ago I was staying at her house in Wales, and was called up at night on one or two occasions, when she appeared to be suffering from what I then supposed to be angina-like attacks, and was, I thought, in great immediate danger. The heart was acting rapidly and irregularly, and I believed that she had serious organic cardiac disease. She recovered from these attacks; and I do not know (although I saw her on the average every year or two) that I ever examined her heart again. I heard, however, that she still suffered, from time to time, from similar attacks to those in which I attended her. But nevertheless she maintained fairly good health, and I was surprised to observe, year after year, that there was no aggravation of her cardiac symptoms. I saw her a little more than three years ago, and she then seemed well and cheerful.

I have no doubt, guided by my last examination of her, that her case from the beginning was a typical one of functional hurry of the heart, and that there never was any organic disease of that organ. Whether she would have died of her bronchitic attack, if her heart had been functionally healthy, may be questioned.

1. The cases just narrated possibly admit of arrangement in several categories. Thus, in some, the action of the heart was only extremely rapid; in some, it was rapid and also irregular; in most, the attacks of palpitation were paroxysmal; and in some the palpitation appeared to be persistent. Undoubtedly the most striking cases (and these first attracted my attention) were those in which phenomenal hurry of the heart, without obvious irregularity, occurred habitually in paroxysms of varying duration, in persons who were apparently

in other respects healthy. A wider experience, however, has satisfied me, that there is no essential distinction between the cases characterised by simple rapid cardiac action, and those in which rapidity and irregularity are combined; and that, although the tendency to intermission or remission of attacks is a common feature of the disease, the palpitation is always liable, sooner or later, to become indefinitely prolonged.

In those cases in which the palpitation occurs in paroxysms, these come on for the most part without warning, and often without obvious cause, last individually from a few minutes to several hours, or in some instances for several weeks or months, and usually end as suddenly as they begin. The intermissions are equally variable in duration, and, especially early in the disease, may be continued for many months.

In speaking of the rapid cardiac action as being in some cases regular, in others irregular, I have to confess that I use these terms relatively only. In the former class the cardiac pulse during the paroxysms may vary, roughly speaking, from 180 to 300 in the minute, even in the same case; but the changes from one rate to another are sudden, and the persistence of any one rate of beat is relatively considerable. In the other class, the cardiac pulsation is characteristically irregular; that is, small groups of slow and strong beats alternate with small groups of rapid and feeble beats, each group lasting between, say, one and ten seconds. The difference between the two cases is very obvious as a clinical fact, but the irregular pulse is apt at times to become regular, and by simple shortening of the duration of the successive rates of beat, it is clear that what seems a regular pulse would become irregular.

In all cases, as might be supposed, the pulse at the wrist is extremely feeble; and even in cases where the action of the heart seems regular, the regularity usually does not extend to the radial pulse. When the heart is acting irregularly, the pulse at the wrist is often imperceptible for many seconds together, so that without examination of the heart it might be assumed that this was motionless during the whole of the time. In fact this disappearance of the radial pulse in the intervals between groups of stronger beats not unfrequently misleads the practitioner in this sense.

2. On what the undue rapidity of action of the heart primarily depends is difficult to determine. In most of my cases no definite cause for the commencement of the disorder could be discovered; and in those cases in which a cause was assigned, it was generally doubtful if the apparent cause had anything to do with the matter. In Cases 8 and 9 the palpitation seems certainly to have been induced suddenly by over-exertion, and in Case 7 there is good reason to believe that the malady dated from an attack of cardiac distress brought on by running. In my fourth case there is no history of violent muscular exertion, but the palpitation first showed itself at a time when the patient had much continuous work and responsibility. In another instance, Case 5, the symptoms appear to have dated from what was said to be a sun-stroke—an attack the real nature of which is doubtful. In Case 6 there was a definite history of syphilis. On the whole, I am inclined to think that the evidence (such as it is) points to the origin of the malady in either mental or bodily over-exertion.

3. The question naturally suggests itself, as to whether these cases have any relation to hysteria on the one hand, or to exophthalmos on the other. In answer to the first question I may point out that several of my quoted cases, and, I may add, most of the other cases I have met with but have not thought it worth while to record, were in men; and that few, if any, even of the women presented any hysterical history, or manifested characteristic hysterical symptoms. As to the second question, I may observe that although extremely rapid action of the heart is one of the usual phenomena of exophthalmos, I have rarely or never observed such rapid action in that disease as has characterised the cases brought together in this paper, nor have I noticed in it the alternation between excited and normal pulsation which was the striking feature of so many of them. At the same time it is noteworthy that in Case 3, in which the cardiac pulsations rose to 240 in the minute, there was actually a goitre. There was no additional evidence, however, of exophthalmos in her case; and I have reason to suspect that the association of the goitre with the palpitation was accidental.

4. One of the most remarkable facts in the history of cases of inordinately rapid action of the heart is the capability which many of the patients manifest of taking active exercise, and of doing their ordinary business, even when the palpitation is upon them, and the little distress which the palpitation causes. This was noticeable even in the case of my first patient, who was kept in bed, and at rest, not because she felt ill or incapable of exertion, but because the medical man ordered it. Mr. S. (Case 5) was going about apparently well, and assured me that shortly before I saw him he had (although sixty-five years of age) run three miles in twenty minutes without suffering. Mr. C. also (Case 6) not only went about his daily business, but enjoyed a trip in Switzerland. The most remarkable example, however, of this phenomenon was Miss J., who, up to the time at which her cardiac affection induced dropsy and other symptoms of cardiac incompetence, lived during her attack as she was accustomed to live when she was free from them, walked and did important official work daily, and even travelled to various parts of the country in pursuance of her duties as a Government inspector.

No doubt in all cases my patients suffered more or less from symptoms referrible to the heart, and in some the symptoms were distressing and serious. They were mainly an uneasy feeling with a sense of fluttering in the præcordial region, shortness of breath, especially on exertion, and faintness; and, associated therewith, more or less duskiness or lividity. Angina-like attacks occurred in one instance. One or two patients complained chiefly of a feeling of restlessness. And one (Case 4), who always gave a very clear and graphic account of her condition, remarked over and over again that when the palpitation was on her she always felt irritable and in a hurry, and as though she must do two or three times as much work in a given time as usual. She, moreover, stated that she always experienced much distress at the onset of her attacks; but that this wore off in great measure after a short time, and that the sense of hurry and of fluttering in the region of the heart alone survived.

5. On the whole the results according to my experience have not been satisfactory, and judging from them alone the

prognosis of such cases is certainly not hopeful. In one or two the disease is still in an early stage, and what the event will be remains to learn. In two or three the disease has lasted for some years; and the attacks have shown a tendency to increase in frequency and duration. But I am sorry to say that, in large proportion, my cases have already proved fatal.

So far as I know, Cases 1 and 5 are still in progress; and the eighth and ninth cases are up to the present time doing well, though not cured. Case 3 was fatal, but it is possible that this was not a true example of the condition under consideration; and the second case also was fatal, but the patient was suffering from advanced organic heart-disease, with probably an aortic aneurism, and his death may be fairly attributed to one or other of these lesions. All my other quoted cases have died. Miss J. (Case 4) died of her disease after it had continued for fifteen or sixteen years. Mr. C. (Case 6) died quite recently, having been liable to palpitation for about eight years. Mrs. J. (Case 10) also died very lately, after suffering for fourteen or fifteen years. And A. W. (Case 7) also died, probably at the end of about eleven years after the first symptoms of disease showed themselves.

Miss J. died with the ordinary symptoms of obstructive heart-disease (namely, general anasarca, pulmonary apoplexy, and congestion of the liver and kidneys), which showed themselves for the first time about five weeks before her death, and were apparently induced by overwork at a time when her heart was acting rapidly. Mr. C.'s death was brought on in much the same way. His fatal symptoms, which included general anasarca, hydrothorax (for which he was tapped twice), congestion of liver and kidneys, lividity and orthopnoea, appeared only about three weeks before he died. Arthur W. died suddenly at a time when, so far as his feelings and appearance were concerned, he seemed to be perfectly healthy. Mrs. J. succumbed to what appeared to be a not very severe attack of bronchitis, the effects of which were obviously aggravated by the weakness of her heart.

Speaking generally of these cases of recurrent palpitation, I should be inclined to say, that the prognosis is fairly hopeful for those persons who are able to lead quiet lives, who

avoid mental or bodily excitement and overwork, who protect themselves from catarrhal and other disorders likely to interfere directly or indirectly with the equilibrium of their circulatory organs, and who nurse themselves with care during their attacks of palpitation. And I am disposed to think that, in many such cases, the progress of the affection may be arrested. I base this opinion partly on the apparently complete restoration of such patients to health in the intervals between their attacks, partly on the long duration of some of their cases without the development of any serious cardiac and other complication, and partly on the circumstances of their fatal attacks when these at length happen to supervene. But it is obvious that patients thus affected run many and continuous risks, and that death, either from a sudden faint or from the coming on of symptoms of cardiac incompetence or obstruction, is always imminent.

6. What the condition of the heart is in these cases is a matter of considerable interest. That such attacks of palpitation as I have described may be associated with organic heart-disease is obvious, from the history of my second case, in which the patient was suffering from advanced aortic regurgitation combined with hypertrophy and dilatation of the left ventricle; and from a case now under my care in which the palpitation, coming on for the first time three or four months ago, is associated with the presence of a præ-systolic apex-murmur, referrible apparently to the effects of an attack of acute rheumatism which occurred more than fifteen years ago. But in most of the cases I have seen there has been nothing to show that the heart was structurally affected; there has been no murmur, there has been no accentuation of the second sound at the left base, and the apex has impinged at the usual spot, or so near it as to show that there can have been little if any real change in bulk. In the only fatal case in which I have obtained a post-mortem examination, the heart was somewhat hypertrophied and dilated, but the valves were absolutely healthy, and so also was the muscular tissue. In this case a systolic apex-murmur was recognised during life, when the heart was beating slowly, and appears to have been due (as was suspected during life) to the mitral valve

allowing of regurgitation in consequence of the ventricular dilatation.

My belief is that the affection has no special connection with cardiac disease, and that dilatation and hypertrophy (when they occur in it independently of valvular mischief) are the slowly developed consequence, and not the cause, of the functional disturbance.

In connection with this subject of the condition of the heart, it is noticeable that during the attacks of palpitation the cardiac pulsations are visible over the whole præcordial region, and there is excessive throbbing in the large arteries of the neck. It might be hastily assumed that this extensive and apparently violent pulsation implied undue force of cardiac action. But that there is no such forcible action is obvious, both from the extraordinary feebleness of the pulse at the wrist, and from the very small amount of blood which is pumped at each ventricular systole into the arteries. The explanation is probably that the cavities of the heart are overburdened with blood, and that the contractions of the ventricles are imperfect, so that only a small proportion of their actual contents is expelled at each systole. For if partial contraction occurs in a full but flabby and elastic-walled cavity, as the heart under such circumstances may be assumed to be, it is clear that the contraction in one part or zone must be attended with a general rise of pressure in, and consequent dilatation of, every other part, in which also there would be general synchronous pulsation. I believe, from having carefully examined several of these cases, that the apex-beat and the impulse over the cardiac area are actually synchronous; whereas if (as one sometimes witnesses, and especially in cases of aneurism of the ascending arch) the pulsations of the surface of the ventricles and of the apex in a healthily acting heart are visible, they are distinctly alternate in rhythm.

7. As to the real nature of the disease which my paper is intended to illustrate, I have little to say. My belief is, as will doubtless have been gathered from all that precedes, that so far as the heart is concerned it is a purely functional disorder, that any structural cardiac disease which may be present must be regarded as accidental, and that the slight hyper-

trophy and dilatation of the heart which may be found in patients who have suffered from the malady for years are (as I have already remarked) the consequence, and not the cause of the palpitation.

8. I have also little to say under the head of treatment. In one or two cases during the attacks of palpitation, I have found digitalis, or digitalis combined with iron, of exceeding value; but in others these drugs have had no beneficial effect whatever. Digitalis and strophanthus, however, are remedies which would naturally suggest themselves, and are always worth a trial. If symptoms of obstructive cardiac disease or of cardiac insufficiency become developed, as I have shown they are likely to be sooner or later, of course the ordinary treatment for such symptoms should be carried out. The little apparent suffering which many patients experience during their attacks permits and encourages them at such times to go about their ordinary work, and even to undergo considerable mental and bodily exertion. It is clear, however, that all such labours are detrimental, and attended with danger; and that the patients should be kept at rest. When one considers the tendency there is in these cases for the malady to become more and more grave and intractable as time goes on, the importance of treating them in the intervals between the attacks, especially in the earlier stages, becomes obvious. I am not prepared to recommend for this purpose the employment of any particular drug, but it seems to me that our aim should be to maintain the patient's general health, to prevent as far as possible undue mental or emotional excitement or severe muscular strain, or continuous mental or bodily hard work, and to treat with special care every attack of palpitation.

VIII.

SOME CASES OF GRAVES'S DISEASE.¹

THE communication which I venture to make to the Society this evening is not based upon an exhaustive review of my experience in exophthalmic goitre, but is limited to an account of several cases which have presented special points of interest, and of which I had already prepared the most important for publication, before I was aware of the intention of the Ophthalmological Society to devote an evening to the discussion of the subject.

The causes to which attacks of exophthalmos are attributed are generally somewhat vague. In a case, however, which I have recently seen, the cause appeared to be very definite. The patient was an unmarried lady, about forty years of age, a person of active mind and habits, and who had enjoyed excellent health until August last. One day, early in that month, she was driving about for some hours in an open chaise. It was a very cold windy day, and she suffered severely from the cold. Her illness dated from that drive. Since then she has suffered from rapid beating of the heart, shortness of breath, and slight œdema of the ankles. Moreover, instead of being, as she was previously, quiet, self-possessed, and of a placid disposition, she has been restless, fidgety, and irritable in temper. The catamenia had been absent since Christmas. She was a spare woman, with an abrupt, jerky manner of acting and speaking, and a look of anxiety, which I am told was quite unnatural. There was no visceral disease that I could discover, but her heart was beating at the rate of 140 in the minute, regularly, and without

¹ *Ophthalmological Transactions*, vol. vi.

murmur. There was no protrusion of the eyeballs; but I remarked that I occasionally saw the sclerotics above the corneæ when she was moving her eyes. The symptoms pointed, I thought, to early Graves's disease, and this view was confirmed when, on examining the neck, I found a small goître, which had hitherto been wholly overlooked.

I have not had the opportunity of watching many cases of Graves's disease throughout their whole course and of observing what ultimately becomes of those cases of which I have seen the beginnings. I know at the present time two ladies, between twenty-five and thirty years of age, who have suffered from the affection for several years, with all its characteristic symptoms, whose condition varies, as it so often does, but who are certainly no worse at the end of five or six years than they were when I first saw them.

About five or six years ago a medical friend of mine in the country brought his daughter, who was then a pupil at one of the high schools for girls in London, to see me on account of the recent development of obvious, but slight, exophthalmos. There were protrusion of the eyeballs, enlarged thyroid, and palpitation. He removed her from school in London, and subsequently I heard that the girl had recovered. I wrote to him a few days ago in regard to her, and he sent me the following reply: 'My daughter is, I am glad to say, quite well. When, however, she gets a little out of sorts there is a tendency to protrusion of the eyeballs, with a little fulness of the neck.' He added, later in the letter, the daughter's own account of herself: 'I have palpitation when I run upstairs very fast, and my mother says she sometimes notices that my eyeballs look a little fuller than usual, but my neck is all right, although I think it is perhaps naturally a little larger than most.' The girl, in fact, is practically well.

About three years ago I was consulted in the case of a single lady, about forty years of age, who for three months had been suffering with severe palpitation and irregular action of heart, shortness of breath, which prevented her from taking any kind of exercise, and diarrhœa, and was evidently exceedingly ill. She had a dark, or dead-leaf tint of face, especially

round the eyes, the eyelids were strongly wrinkled, as though they had been previously either œdematous, or at any rate on the stretch; and the eyes seemed to me slightly prominent. I discovered a small but quite obvious goitre. The heart appeared to be dilated; its action was rapid and irregular, but free from murmur, and there was visible pulsation in the cervical arteries and veins. The case was not brought to me as one of Graves's disease, but, on inquiry, I came to the conclusion that the patient had been suffering, off and on for sixteen years at least, from that affection; that of late years she had greatly improved; but that for the last two years she had been ailing more or less with diarrhœa and sickness and shortness of breath. As stated above, her extreme illness was of only three months' duration. She was taken to the South Coast, and was treated medicinally with digitalis and iron. I heard, at the end of about eight months, that she had improved remarkably; that at that time her complexion was more healthy; that she had very little palpitation; and that she was able to take long walks, and even to run upstairs. I am inclined to think that the condition of this patient is the condition into which many of the sufferers from exophthalmos ultimately pass: namely, that the proptosis and the goitre subside in a greater or less degree, and the palpitation diminishes; while, nevertheless, the patient remains delicate, and with the liability to suffer, under excitement or accidental ill-health, from more or less severe recurrences of palpitation and other symptoms which attend exophthalmos.

The cases of chief interest which have occurred to me are four in number, in all of which death took place: in one instance from the direct effects of the goitre, in one from bronchitis, and in two from organic disease of the heart. Their interest, however, does not lie in the post-mortem examinations; for in none of them was there discovered any lesion of the nervous system to which the exophthalmos could be attributed; the orbits presented no definite condition of their contents explanatory of the protrusion of the eyeballs; and the goitres, so far as they were examined, presented only the ordinary characters of the endemic form of the disease.

CASE 1.—*Graves's disease, followed by ophthalmoplegia externa, by right hemianæsthesia with involvement of organs of special sense, by headache, sickness, and persistent high temperature, and subsequently by right hemiplegia, epileptic fits, bleeding from the ears, &c. Death from bronchitis. Autopsy.*

This case is described at length at page 69. It is that of a young woman who, at the age of twenty, was attacked with the ordinary symptoms of exophthalmic goitre, and who three years later developed the symptoms of ophthalmoplegia externa. Two years subsequently, when she was twenty-five years old, she was admitted into St. Thomas's under my care. At this time she had almost complete ophthalmoplegia externa, with partial ptosis and protuberant eyeballs, right hemianæsthesia, with colour-blindness and loss of taste and smell on the same side, some palpitation and dyspnœa, headache, and sickness. It was not known at that time that she had had Graves's disease, and the protrusion of the eyeballs was attributed to the paralysis of the ocular muscles. The heart seemed healthy, and no enlargement of the thyroid body was discovered. She remained in the hospital two years, during which period various other symptoms were added from time to time to those above enumerated. Epileptic fits came on, which recurred every two or three weeks. She became rigidly paralysed in the right arm and leg. Hæmorrhages took place in the first instance from the right ear, and later from both. Moreover, during the whole duration of her illness her daily temperature ranged, with only occasional exceptions, from 100° to 103° , 104° , or 105° . During her stay in the hospital, and previously, she suffered from time to time from ulceration of the corneæ. Her death was due to a sudden severe attack of bronchitis. At the post-mortem examination the ocular muscles were pale; the thyroid was slightly enlarged; the right side of the heart was relatively large, and a few small granulations were present on the auricular aspect of the mitral valve. No disease of the nervous system was discovered.

CASE 2.—*Graves's disease; thyroid body (especially right lobe) much enlarged and compressing trachea; paroxysmal dyspnœa. Death during an attack.*

A.B., a married woman, æt. 30, was admitted under my care on September 21, 1880. She had suffered only from the usual diseases of childhood up to the time at which her present illness commenced. She had been married six years, and four years ago had her first and only child, which died a few hours after birth. It was about that time that

she began to suffer from palpitation, and that her eyes were first observed to be prominent. These conditions increased upon her during the next eighteen months, and then her neck began to swell. The exophthalmos and palpitation (induced by the slightest exertion or emotion) have continued ever since; and the goitre has progressively enlarged. The catamenia have been irregular and scanty from the time of their first appearance, and wholly absent for the last two years. Her symptoms have never been aggravated at the catamenial periods; but she has observed the neck to enlarge and the eyes to become specially prominent when she has had a cold.

Quite recently she has suffered from fits of dyspnoea; and a specially severe one, occurring on the morning of the 21st, made her seek admission into the hospital.

She was a thin, dark-complexioned woman. Her eyeballs were very prominent, and when she looked straightforward the sclerotics were visible both above and below the corneæ. The lids were not fully closed during sleep. The sight was good, but the eyes soon got tired of looking at objects.

The thyroid body was much enlarged, especially its right lobe. It extended on either side to the posterior edge of the sternomastoid muscle, and there turned upwards as far as a line drawn from the mastoid process to the angle of the jaw. In the mid line the swelling reached the thyroid cartilage above; and the sternal notch and clavicles formed its lower boundary. The carotid arteries were visible, pulsating violently, behind the posterior limits of the tumour. The breath-sounds were markedly stridulous; but as she lay in bed she did not seem to suffer from any respiratory distress. Her voice was unaffected.

The heart was beating at the rate of 120 in the minute. Its action was violent, but free from murmur. Pulse weak. Sonorous rhonchi were audible over the lungs; but there was no sign of important disease in the lungs, and she had no cough.

The tongue was clean, the appetite fair. Urine, sp. gr. 1019; free from albumen.

I saw her on the day of admission, and after careful consideration of the case came to the conclusion that there was no immediate danger, and indeed thought her symptoms might subside with the influence of rest and the avoidance of excitement.

The next day she was reported to be decidedly better. But during the night a severe attack of dyspnoea came on, and her face became much congested. The following morning she was again better, and she continued fairly well during the day. Towards night, however, the breathing once more became difficult, and her

face livid. As the symptoms increased in severity, the assistant surgeon in residence (a locum tenens) was consulted by the house physician as to the expediency of performing some operation for the patient's relief. Unfortunately, however, he decided that tracheotomy could not be performed, on account of the thickness of the tumour, and that no alternative operation was feasible. The dyspnoea increased, and after much suffering the poor woman died asphyxiated at 4 A.M. on the 24th.

During her illness her temperature ranged from 99.2° to 99.6° .

Post-mortem Examination.—Body emaciated. Brain somewhat congested, otherwise healthy. The eyes were prominent after death, as they had been before, but they were healthy; and nothing abnormal was found in the orbits except a distinctly increased quantity of yellow fat. The thyroid body was large, especially on the right side, and its superficial limits corresponded with the description previously given, but it was found to surround the trachea (which it compressed) and œsophagus, its lateral lobes coming into contact with one another behind the latter tube.

CASE 3.—*Graves's disease; thyroid body (especially right lobe) enlarged; compression of trachea with stridor; disease of aortic, mitral, and tricuspid valves; removal of isthmus of thyroid, followed by atrophy of the gland. Death from heart-disease. Autopsy.*

Julia H., a single woman, æt. 27, was admitted under my care on October 8, 1883.

When twelve years old she was in St. Thomas's Hospital for three months, with chorea, of which she got well, and never had any recurrence. Six years ago she began to complain of palpitation and shortness of breath, which symptoms have much increased of late. About twelve months before admission, enlargement of the throat was first observed, and a little later the eyes began to get prominent. She has had a winter cough for years, and for some months has been very liable to attacks of syncope and dyspnoea. She has also complained occasionally of difficulty of swallowing. The catamenia have been absent for five months.

She is a thin, pallid, fragile-looking creature, complaining of pain in the loins, weakness, and palpitation. The eyes are extremely prominent and the whites are visible above the corneæ, but the lids can be closed, though with an effort. The left conjunctiva is congested, and the pupils are unequal; but in other respects the eyes are healthy. A large, hard, and somewhat irregular goitre occupies the front and sides of the neck, from the pomum Adami

above to the sternum below, and to beyond the posterior margins of the sterno-mastoids behind, which muscles are stretched over it. The right lobe is larger than the left, and displaces the trachea slightly to the left, and the lobes are united by an isthmus, the vertical diameter of which measures about an inch. There is no pulsation in the tumour, but the veins in the neck are largely dilated, and pulsate distinctly. The goitre not only displaces but compresses the trachæa; for though she does not complain at present of dyspnœa, her breathing is distinctly stridulous, especially when it is hurried or deep. The præcordial dulness is somewhat extended, and there is visible pulsation in the left third, fourth, and fifth interspaces, and in the right fourth. The apex, however, beats in its normal situation. A diastolic aortic murmur is audible over the whole of the præcordium; but it is most distinct and somewhat musical in the aortic area. There is a soft systolic murmur at the apex, which can also be heard in the axilla. And to the left side of the lower extremity of the sternum a dull, booming, systolic murmur can be heard, which diminishes in loudness both towards the base of the heart and towards the apex, where the mitral murmur becomes distinct. The house physician who examined the patient at another time states that he also heard a well-marked presystolic mitral murmur. Pulse regular, but quick (about 130), feeble, and jerky. There is no sign of pulmonary affection. The urine has a sp. gr. of 1020, presents a trace of albumen, and contains numerous large oxalate of lime crystals, and some granular and hyaline casts. No anasarca.

For the next month there was no material change in her condition; she varied in health from time to time, and though very weak was able to get up occasionally. On the whole perhaps she was somewhat better at the end of the month than she had been at the time of admission. During this time the eyes, although they never became normal, varied considerably in their degree of prominence, and on the whole the right eye protruded more than the left; moreover, she suffered a good deal from conjunctivitis. The goitre underwent no obvious change, but the girth of the neck at its seat of chief enlargement varied between $13\frac{3}{4}$ inches and $14\frac{1}{2}$ inches. She complained little of difficulty in swallowing; but there was always marked stridor on deep inspiration, and sometimes so much difficulty in breathing that she was compelled to sit up in bed. The palpitation of the heart and the pulsation of the veins in the neck continued. The pulse ranged from 84 to 120. The cardiac murmurs varied somewhat; the presystolic mitral was said to be audible occasionally, the diastolic aortic was never very distinct and

often could not be heard, but the soft mitral systolic was always well-marked, as also was the deeper-toned and rougher systolic murmur at the lower end of the sternum. In this situation also there was often heard a soft diastolic murmur, which (although inaudible at the base) was thought to be the diastolic aortic murmur which had been previously detected. The urine varied in specific gravity from 1015 to 1028, and always contained a small amount of albumen with casts, and almost always oxalate of lime crystals. During the greater part of the time she had slight cough with mucous expectoration, and a tendency to faint away.

The persistent stridor, and the occasional marked difficulty of breathing, which the patient suffered from, associated with the presence of obvious compression of the trachea by the goitre, showed that there was liability to death by suffocation, and it became important, therefore, to consider whether anything could be done to obviate this danger. The comparative narrowness of the isthmus of the thyroid body naturally suggested the division of this part, as had been successfully done by Mr. Sydney Jones in a former case of mine in which an ordinary goitre was compressing the trachea; and on consultation with that gentleman it was determined that this procedure should be adopted.

Accordingly, on November 7, she was put under chloroform, and Mr. Jones proceeded to operate. He made a vertical incision in the median line of the neck; next exposed the isthmus and adjoining portions of the lateral lobes of the thyroid body, and having detached the isthmus from the parts beneath, transfixed and strangulated with ligatures the lateral lobes at about an inch from the central line, and then removed the portion of the gland lying between the ligatures. Many vessels had to be tied, and the patient lost a considerable quantity of blood. The isthmus measured three-quarters of an inch from above downwards and a quarter of an inch in thickness. The trachea at the seat of operation was flattened from side to side, and in front formed an acute angle. Antiseptic precautions were adopted, and a drainage-tube was left in the wound.

Some constitutional disturbance followed the operation, and continued during the next five or six days. The pulse and respirations became rapid, the former often exceeding 130 in the minute, the latter varying between 30 and 40; the temperature rose daily above 108°; the tongue became coated, the appetite impaired; she perspired much, and slept little, excepting with the aid of sedatives. Unfortunately also the right cornea ulcerated (as was believed in consequence of the accidental application of chloroform to it during the operation), caused extreme pain, and for a time put the eye in

serious jeopardy; and some catarrhal affection of the throat and bronchial tubes appeared.

It is needless to go through the monotony of recounting the patient's daily symptoms during the next four months of her life. The operation was successful in its immediate object; the cornea healed; the main symptoms of her disease continued with little or no abatement, but gradually the mechanical consequences of her heart-disease developed, and ultimately caused her death.

The wound in the neck went on favourably but slowly, and finally closed about the middle of December. At that time the girth of the neck (which had been $14\frac{1}{2}$ inches) was only $12\frac{1}{4}$ inches. The lobes of the thyroid had greatly shrunk, and the goitre was inconspicuous. The ulceration of the cornea made slow and variable progress, but caused constant and often very severe suffering; it had healed over, however, by the middle of December. More or less inflammation of the conjunctivæ and eyelids continued, and troubled her from time to time during the remainder of her life. The prominence of the eyes varied, and usually the left protruded less than the other. For a time, indeed, it was thought that the operation in the neck had been followed by progressive subsidence of the eyes, and it was hoped had cured the protrusion; but this view had to be given up. Nevertheless the exophthalmos was somewhat less marked during the latter part of her stay in the hospital than it was at the time of her admission. The tendency to stridor during respiration disappeared entirely after the operation, but still at times the breathing became rapid. A short time after the operation attacks of faintness, such as she had had previous to admission, but which had in great measure left her while in hospital, began to recur. They came on at irregular intervals, sometimes two or three times a day, and she would remain in them scarcely conscious for a quarter of an hour or more at a time. The first of these was noted on November 16, at a time when the immediate effects of the operation had apparently passed away; they continued, off and on, for two or three weeks, disappeared for a time, and returned with increased severity and frequency in the latter part of January. She was emotional and on one or two occasions suffered from temporary delusions. The urine was acid, often contained traces of albumen, and presented as a rule large crystals of oxalate of lime.

Early in January, she had a sharp attack of tonsillitis, and her temperature rose to 105° . This complication lasted for several days.

About the middle of January (at which time she seemed to have improved, so far as most of the special symptoms were concerned) she began to get manifestly weaker day by day, and to suffer from

symptoms apparently due to her cardiac disease. Diarrhoea came on, and continued. The urine (the specific gravity of which varied between 1015 and 1025, and which on the whole became scanty) began to contain from one-third to one-half of albumen, and to present granular casts; the action of her heart, which, though very variable in rate, had hitherto been regular, became rapid, feeble, and irregular. Moreover the veins in the neck showed increased distension, and pulsation was visible in them, and in the veins of the arms and hands. At the end of January it was noted for the first time that she had œdema of the feet and ankles. The œdema increased from this time, and before long became general. About February 20, evidence of serous effusion into the right pleura was first observed, and the dulness and other signs of this condition gradually increased. On the 2nd or 3rd of March, superficial inflammation of the left leg and thigh, associated with rise of temperature, was observed. She then rapidly sank, and died exhausted on March 5.

A few facts may here be added. The patient's temperature was always normal, excepting just after the operation, when she had tonsillitis, and again when erythema attacked her leg. The condition of her heart was a matter of constant interest. It was thought that latterly the area of its dulness diminished; but at this time its action was becoming irregular. Frequent records of the auscultatory phenomena were made; and the statements in them varied from time to time. A soft systolic murmur at the extreme apex was always audible, and at times a distinct presystolic murmur was present in the same situation. The rough, loud, and prolonged systolic murmur just to the left of the lower end of the sternum was heard from time to time during the earlier part of the patient's stay, but disappeared latterly. The aortic diastolic murmur, too, lost its musical character and was at times inaudible. In January, however, at a time when the presumed tricuspid regurgitant murmur was absent, a soft double (doubtless aortic) murmur was heard between the nipple and the sternum. On the whole, the phenomena pointed to obstructive and regurgitant disease at both the aortic and the mitral orifice, and to regurgitation at the tricuspid.

Autopsy.—Emaciated; much œdema, especially of lower extremities.

Chest: The right pleural cavity contained three pints of serum; the left half a pint. The right lung was collapsed and airless, excepting at the extreme apex. The left lung was larger than the other, tough and œdematous. It presented two infarcts, the one recent, the other old. The pericardium measured six and

a half inches vertically and six inches transversely, and contained a few ounces of serum. The heart was large, weighing $15\frac{1}{2}$ oz. both ventricles were thickened and dilated; the auricles also were dilated. The aortic valve was thickened, fibrous, and contracted. The mitral valve was similarly affected, and formed a narrow slit. The tricuspid valve was also thickened and contracted, and its orifice formed a narrow chink. There was much dark clot in the right auricle.

The abdominal cavity contained two or three pints of fluid. The abdominal viscera were mostly healthy. The liver was somewhat congested, the spleen was larger than natural, and the kidneys, which were somewhat tough, presented one or two small yellow infarcts.

The brain, cord, and sympathetic nerves appeared to be healthy.

There was much fat in the orbits, and the eyes, optic nerves, and ophthalmic vessels were all healthy.

There was a cicatrix in the middle line of the lower part of the neck; and the space between this and the trachea (in the situation of the isthmus of the thyroid body) was occupied by indurated cicatricial tissue. The lateral lobes of the thyroid gland, which were disconnected, were somewhat larger than natural. The trachea in the neighbourhood of the gland was flattened from side to side, and its rings were somewhat thinned.

CASE 4.—Exophthalmic goitre; right lobe chiefly enlarged; rheumatic endocarditis; infarcts in spleen. Death, mainly from the effects of heart-disease. Autopsy.

Emma B., a single woman, 32 years of age, came under my care on September 20, 1882.

Four years ago she was laid up with acute rheumatism, and two years later she had a second attack. Four months ago she began to suffer from severe pain in the region of the heart, and œdema of the legs; and from that date she has been getting weak and thin. Eight years ago, while in service, she suffered much from debility, at which time her eyes became prominent. They have varied in their prominence ever since. She has not observed enlargement of the neck.

She was a weak, emaciated woman, with very prominent eyeballs (the sclerotics being visible between the irides and the upper eyelids, which latter did not close in sleep), a distinct but not very large goitre, and a frequent, troublesome cough. It appeared, further, that she suffered from palpitation; that the præcordial dulness was enlarged, the heart's beat diffused, its apex rather more to the left and lower down than in health; that there was

epigastric pulsation, and a loud mitral systolic murmur; that the arteries in the neck pulsated unduly; that the jugular veins were distended; and that there was some œdema of the lower extremities. No other evidence of disease was detected, and the urine at that time was free from albumen.

During the two months she was under my care, she suffered mainly from constant dry cough, shortness of breath, pain in the left side, which varied in seat, but for a few days was distinctly in the situation of the spleen, œdema of the legs, aching and watering of the eyes, and extreme debility. The urine, which generally contained albumen, was abundant, and had a specific gravity of about 1011. The temperature for the most part presented a febrile rise daily, and on several occasions reached to between 103° and 104° .

On November 21, it was noted that she felt much worse, that the eyes were more prominent, and ached; that there was much fulness of the jugular veins and pulsation in them; that she coughed a good deal; that the temperature rose in the evening to 103.2° ; and that she had had a rigor. The next morning her temperature reached 104.2° .

On the 22nd she felt better early in the morning, but as the day advanced she became extremely feeble, and she died in the evening.

Autopsy.—Brain healthy. Cavernous sinuses seemed a little dilated. Both orbits contained a great excess of fat, but presented no other abnormal appearance. The goitre was small, the right lobe being somewhat larger than the left. The heart was enlarged, especially the right ventricle, and weighed 11 oz. The walls of the right ventricle were much thickened, those of the left ventricle scarcely, if at all, thicker than natural. The valves on the right side were healthy in appearance, but the tricuspid allowed of regurgitation. Some fine vegetations were adherent to the ventricular aspect of the aortic valve; but there was no distinct obstruction offered by them, and the valve was competent. The mitral orifice was constricted, so that it only allowed of the passage of the tips of two fingers, and warty vegetations sprang from the lining membrane of the left auricle close to the attachment of the valves, and from the chordæ tendinæ. The valve was incompetent. The lungs were congested and cedematous, otherwise healthy. Liver large, congested. Spleen very large, weighing 1 lb. $9\frac{1}{4}$ oz. Capsule thickened. It presented several largish infarcts, most of which were yellowish-white, tough and old, but one of which was softish, nearly of the colour of the spleen itself, and evidently somewhat recent. The kidneys were large and pale. There was some dropsical accumulation in each of the serous cavities.

IX.

*CASES OF RECOVERY FROM SYMPTOMS POINT-
ING TO THE PRESENCE OF PROGRESSIVE
ORGANIC CEREBRAL DISEASE.¹*

INTERESTING as all cases of intracranial disease are from many points of view, those are specially interesting to the practical physician in which recovery ensues from symptoms which former experience had led him to regard as indicative of progressive mischief tending to a fatal result. Of recovery more or less complete, from all kinds of so-called 'functional' disorders, we have, of course, ample experience. Of recovery, also more or less complete, from small hæmorrhagic effusions or from small patches of softening, again clear evidence is sufficiently abundant. Simple inflammation of the surface, or even of the substance, of the brain, no doubt subsides, leaving little or no clinical trace of its pre-existence; and, probably, this is of more common occurrence than most of us suspect. Syphilitic affections, again, are not unfrequently benefited, and sometimes cured, by appropriate treatment. Nevertheless it cannot be denied that symptoms obviously due to inflammation of the cerebral meninges, symptoms pointing to the presence of cerebral tubercle, symptoms characteristic of tumours of the brain, and even symptoms apparently referrible to progressive degenerative processes, are properly regarded as of the gravest omen, and in the great majority of cases foretell a fatal issue.

The cases which I am about to narrate derive their chief interest from such considerations as have inspired the foregoing paragraph. Two of them impressed me greatly; because

¹ *Brain*, April 1885.

from their symptoms and progress I had gradually been confirmed in the belief that they were hopeless, when lo! amendment took place, and before long the patients were restored to health.

The first case was that of a young woman, who when she came under my care, had been complaining for three weeks of abdominal pain; who on her admission into hospital was suffering from subacute peritonitis, with fluid effusion into the abdominal cavity; and who during the next seven weeks presented symptoms which were ascribed, and I think rightly ascribed, to tubercular peritonitis. She had general pain and tenderness of the belly, with more or less fulness, constant sickness, hectic temperature, and progressive emaciation and debility, which appeared to be uninfluenced beneficially by any kind of treatment that was adopted. Then she began to squint, from partial paralysis of both external recti, and of the left internal rectus, to present oscillation of the eyeballs, to lose memory, and to have delusions. It was naturally, and I still think correctly, surmised that intracranial tuberculosis had been added to the abdominal tuberculosis; it was also, I think, naturally surmised that the condition of the patient, previously sufficiently grave, had now become hopeless. In the course of a few days, however, to my surprise, the aspect of affairs began to brighten. By degrees, yet rapidly, the temperature became normal, the abdominal symptoms subsided, the sickness ceased, appetite returned, and the patient began to sit up and take interest in all that was going on around her. A little later her squint also disappeared, and she lost her delusions; and six or seven weeks after the first appearance of squint, she left St. Thomas's for a convalescent home, still forgetful and still presenting slight nystagmus, but in all other respects perfectly restored to health. I saw her on February 3rd of the present year, 1885; she came to see me at my request. I found that for the last twelve months she had been working at a laundry, that she had had good health, and no recurrence of her former symptoms, and that she looked well, but that she had never recovered her previous good memory. The following is a detailed account of this case:—

CASE 1.—*Tubercular peritonitis (?) ; tubercular meningitis, or tubercular tumour of the brain (?)*. Recovery.

Arabella D., an unmarried woman 23 years of age, was admitted under my care on October 4, 1883. Her health had been good up to three weeks ago, when, as she was carrying a heavy tray, she felt a sudden sharp pain in the umbilical region. She has suffered from abdominal pain of varying severity ever since, and her abdomen has enlarged.

She is a dark-complexioned, good-looking, fairly nourished girl, complaining of abdominal swelling, and of pain referred chiefly to the hypochondriac regions. The belly is uniformly distended, and measures 35 inches in girth at the umbilicus. It is resonant in front, and dull in the flanks, as she lies on her back; and the relations of the resonant and dull areas vary with position. There is some tenderness on pressure; but no evidence of tumour, or of enlargement of liver or spleen. No anasarca in legs or elsewhere. The thoracic organs are normal, excepting that the heart's apex beats a little higher than natural, and that there is some crepitation at the bases of the lungs. There is no evidence of mischief at the apices. Appetite bad; tongue furred, but moist; pulse 80; respirations 20; temperature varying from 98·4 to 99. Urine, sp. gr. 1024; no albumen.

During the next week there was little change in her condition, excepting that the ascites gradually increased, until the girth of the abdomen measured more than 40 inches, and resonance disappeared excepting on deep pressure. The impairment of appetite continued; she complained constantly of pain and tenderness in the abdomen, which were not always referred, as at first, to the hypochondriac regions; her temperature rose daily above 100°, but varied between 98·4° and 100·6°; and her urine was of high specific gravity, and contained abundant urates.

On the 11th she had an attack of diarrhœa, and her bowels were moved eight times; she vomited a good deal, complained of much epigastric pain, and her temperature rose in the morning to 102·2°. The tongue was covered with brown fur.

The diarrhœa continued off and on for a week, during the first two or three days of which she still vomited. She complained during the week of pain and tenderness of the abdomen, chiefly in the epigastric region, and also of pain between the shoulders; her appetite was very bad, her tongue brown and inclined to be dry, and her urine presented a little albumen and a few granular and hyaline

casts. The temperature reached 102.8° on the 12th, and subsequently varied between 98.4° and 101° . The ascites remained unaltered.

From the end of this week to about November 22, the patient got steadily weaker and thinner, and suffered from profuse nocturnal perspirations. Her bowels were variable, but on the whole inclined to constipation. She suffered from sickness, and often vomited several times in the day. Her tongue was coated; her appetite very bad. The pain and tenderness in the abdomen never left her; and at times the pain, which was paroxysmal and referred mainly to the umbilical and epigastric regions, was very severe. But during the last fortnight of the time the ascitic fluid disappeared, and the girth of the abdomen became reduced to $27\frac{1}{2}$ inches. The reduction, however, was not attended with any diminution of pain or tenderness, and the abdominal walls became rigid. The temperature varied for the most part between 99° and 101° , occasionally becoming sub-normal, and at times rising above 101° . From the 18th of November onwards, however, it never reached 100° , and was usually normal or sub-normal. The pulse, which was always feeble, ranged from 80 to 116. The urine continued scanty and high-coloured, and usually contained a trace of albumen. The catamenia, which were due about the time of her admission, did not make their appearance either then or subsequently. She had no cough or sign of disease at the apices; but the sub-crepitation, audible at the bases on admission, was audible from time to time subsequently.

On November 24 it was noted that for a day or two she had been complaining of double vision; and it was found that she had an internal squint with both eyes (the left external rectus being the weaker), and nystagmus. But she had no headache, giddiness, tremors, or colour-blindness.

On the 26th she was examined by the ophthalmic surgeon, who observed that there was defective movement of both eyes outwards, and slight impairment of inward movement in the left eye, and that the internal structures of the eyes were healthy. There was still nystagmus. Still also she complained of dull aching pain across the upper part of the abdomen; she vomited a little at night; and the urine contained a trace of albumen. Her temperature was normal.

28th.—The condition of the eyes is unaltered, and there is still some pain across the epigastrium. But the patient has been improving in all other respects during the last few days; she is bright and cheerful and hungry; sickness has ceased; and her abdominal

uneasiness has so much diminished that she has been able to sleep without the hypodermic injections of morphia to which she has been accustomed almost ever since admission. Pulse 114; temperature normal; urine 1030, many oxalate of lime crystals, and a trace of albumen. Ever since the eyes have become affected the patient has suffered from loss of memory (cannot recollect the days of the week, the times of my visits, whether she has had her dinner, &c.) and from delusions (such as that her mother has brought her a pineapple; that her father, who has long been dead, has been sitting beside her).

From this time forwards there was progressive improvement. The patient had no return of sickness, and enjoyed good appetite; her abdomen became more and more flaccid, and free from pain, which finally disappeared wholly; the diplopia gradually diminished, and had quite subsided by December 16, but nystagmus (especially when she looked to the extreme left) continued; her temperature ranged from about 97° to 98.2° ; she put on flesh, recovered strength, and became lively and happy. On December 2, and for a few days subsequently, she complained of pain across the forehead, and slight giddiness; but these symptoms did not recur. The fundi of the eyes, before she left the hospital, were carefully examined by Mr. Nettleship, who failed to discover any choroidal tubercles, and reported them as being quite healthy.

On January 9 she was sent to a convalescent home. At that date she expressed herself as feeling, and looked, quite well; she was enjoying her food, and helping in the ward; the abdomen was soft and void of pain, tenderness, or tumour; the urine was free from albumen; she had no headache or double vision; but slight nystagmus was still observable when she looked out of the corners of her eyes; and she was still forgetful. There was no evidence of pulmonary disease. She weighed 6 stone 11 lb.

During her stay in the hospital she was treated mainly with morphia, administered subcutaneously, and tonics.

There is, no doubt, much that is difficult to understand in the narrative which has just been given. It is especially difficult to comprehend how or why the abdominal symptoms should have subsided just as the cerebral symptoms came on, and how or why the latter should in their turn have passed away, leaving the patient apparently healthy. I think that no one who watched the case during life doubted, and that few of those who read the notes carefully can doubt, that the girl was

suffering from tubercular peritonitis. The symptoms and progress of the case were exactly what one constantly witnesses in that disease, and, so far as I know, in no other. Moreover recovery from the symptoms of tubercular peritonitis, though certainly rare, is not unprecedented. But if she had tubercular peritonitis, it is difficult to believe that her cerebral symptoms could have been due to anything else than intracranial tuberculosis. I do not see how the combination of double internal squint, nystagmus, and loss of memory, could have been merely functional. There was no ground whatever, from the antecedents of the girl, to suspect syphilis; moreover she recovered without the use of antisyphilitic treatment. No doubt inflammation at the base of the brain may be idiopathic; and this might furnish the explanation of her symptoms. But the arguments which might be adduced against the presence of simple meningitis are of the same kind as those that might be adduced against the presence of tubercular meningitis; and it is the less likely of the two explanations in this case, inasmuch as there was strong evidence in favour of the presence of tubercles elsewhere. I believe that the patient was suffering from cerebral tuberculosis; but whether this was in the form of slight basal meningitis, or of tumours in the substance of the cerebellum or elsewhere, I cannot venture to decide. The absence of optic neuritis, which is not uncommon in either of these affections, does not help the diagnosis.

In connection with this case I may briefly advert to another which came under my notice some years ago, and which has some kind of relation to it.

CASE 2.

On May 5, 1875, a servant-girl, 15 years of age, came under my care. She had had good health up to the three weeks before I saw her. Then she began to suffer from pains in the head, back, and abdomen, giddiness, drowsiness by day and restlessness at night. Also she began to see double.

On admission, she was a fairly healthy-looking girl, complaining of headache, giddiness, and double vision. She was very drowsy, and indisposed to answer or take notice. Her pulse was 48, her respirations 24, her temperature normal. She had paralysis of both external recti, and well-marked double optic neuritis of recent

origin. For some days afterwards she remained somewhat drowsy and torpid, with slow pulse, and at times irregular respiration of the Cheyne-Stokes character; her temperature at the same time being slightly below the normal. Then she gradually improved, her squint disappeared, and at the end of four weeks from her admission she left the hospital well, excepting for the persistence of optic neuritis.

She was re-admitted twelve days later, suffering from weakness, pains in back, short breath on exertion, and slight cough. She also complained of a little pain in the right temple, weakness of eyes, and some giddiness when walking. She was suffering from slight bronchial catarrh, and while in the hospital had an attack of erythema nodosum, during which her temperature varied between 99° and 102° , and on one occasion rose to 102.8 . She remained in the hospital two months, and left fairly well. On leaving, there was still marked evidence of double optic neuritis, but no other definite indications of cerebral disease. There was no clear indication of tuberculosis. But I thought at the time, and am still inclined to think, that her symptoms were due to tubercular meningitis.

The third case was that of a woman, 39 years of age, who in the midst of apparently good health was attacked with double vision and giddiness, followed in about three weeks by headache and inability to stand. Then she vomited, and complained of numbness of the right half of the upper lip. At the end of a month she had headache, staggered like a tipsy person when she attempted to walk, suffered from distressing nausea, had incomplete paralysis of the right portio dura, paralysis of the right external rectus, and slight paralysis of the left internal rectus, horizontal nystagmus when she turned her eyes strongly to the left, and contraction of the right half of the field of vision. She had no other paralysis, no impairment of sensation, no affection of the internal muscles of the eyes, no optic neuritis, no colour-blindness, and no loss of taste or smell. Soon afterwards the left external rectus became paralysed. Then came on numbness and tingling in the feet, with involuntary jumpings of the legs, tendency to stiffness, and increase of tendon reflexes. A short time afterwards a little twitching of the left angle of the mouth was observed, which soon extended to the left eyelids and to the

left hand. By this time too she had become colour-blind with both eyes. Lastly, numbness and weakness of the right arm supervened, followed by marked contracture. At the end of three months from the beginning of her illness, her symptoms were at their worst; and, looking to their gravity and their rapid progress, I must confess I took a very unfavourable view of the patient's chances of recovery. Nevertheless amendment took place; one by one her symptoms disappeared; and in two months more she left the hospital in all essential points restored to health. And now at the end of nearly two years she is, I believe, earning her livelihood as a nurse. The following is a full account of this case.

CASE 8.—Symptoms pointing to progressive disease in the neighbourhood of the fourth ventricle, coming on gradually, and finally subsiding under treatment.

Eliza N., a nurse, single, aged 39, was admitted into St. Thomas's under my care on January 17, 1883.

Excepting that she had had an attack of enteric fever ten years previously, and subsequently occasional slight rheumatic pains, she had enjoyed excellent health, until her present illness began. There was no history or evidence of syphilis.

She had been attending on a private paralytic patient, when suddenly a month ago, while feeding him, she was attacked with double vision. This was accompanied by a sense of giddiness and nausea—a feeling of sea-sickness, as she termed it. These symptoms continued, and about three weeks afterwards she found, on getting out of bed, that she could not stand, and in fact tumbled while stooping for her slippers. On the 12th she first complained of headache over both the frontal and the occipital regions, a sense of pressure, and as if her head were too heavy for her. On the 15th she vomited, and noticed numbness and weakness of right half of upper lip.

She is a healthy-looking, well-nourished woman, complaining of headache, nausea, giddiness, and consequent inability to stand, and difficulty in using the upper lip on the right side. Her headache is severe and more or less general, but is referred mainly to the frontal region. There is an area of tenderness to percussion, however, at the back of the left parietal bone. The forehead also is somewhat tender to percussion. The nausea is distressing, but is present mainly when she sits up in bed, or tries to stand. She is unable

to walk without assistance, or even to stand; staggers like a drunken person, and has a tendency (she says) to fall over to the left rather than to the right side. There are no ataxic movements. There is slight, but obvious, paralysis of the right facial nerve; the right eyelids close imperfectly; the right upper lip evidently acts feebly; and the right side of the face generally is smoother than the other. Nevertheless, the right angle of the mouth moves freely when she laughs. The tongue is protruded slightly towards the left, but when the organ is drawn in again, its left side looks plumper and lies higher than the right. There is no obvious difference in the appearance or action of the two sides of the soft palate; but the uvula is concave towards the right side, and its apex points in that direction. She presents a marked squint. The right external rectus appears to be completely paralysed; and the left internal rectus slightly paralysed; and there is well-marked horizontal nystagmus when she looks strongly to the left. Pupils normal. There is no optic neuritis. She can distinguish the forms of objects and colours perfectly; but there is apparently some contraction of the field of vision towards the right side. Smell and taste and speech are unimpaired. No affection of the ears, excepting that she has slight deafness on the left side, which dates from childhood. No paralysis or anæsthesia of limbs; tendon and superficial reflexes normal; mental condition healthy; no hysterical symptoms. Thoracic and abdominal organs healthy; tongue clean; appetite fair; bowels open; catamenia regular; urine normal; temperature 99·6°.

The presence of the symptoms above detailed was confirmed during the next few days by repeated and careful examination. And Mr. Nettleship not only concurred in the description of the eyes above given, but, by investigation of the field of vision, discovered that the right half was so largely contracted for both eyes as almost to cause hemiopia. Her headache varied in severity, but was rarely if ever absent, and often intense. Her nausea remained for the most part in abeyance so long as she lay perfectly still, but became severe when she sat up in bed, and especially when she was made to stand. Her appetite was maintained. She continued quite unable to stand alone.

On the 23rd it was noticed that there was decided weakness of the left external rectus, in addition to the former ocular defects. This became more pronounced during the next four days.

On the 27th she first experienced a feeling of numbness and coldness at the bottom of the feet, which in the course of a few days amounted to a sense of pins and needles. On February 12 she

complained that her legs felt stiff, and that they jumped at times. She could move her legs pretty freely; but they tended to become rigid, especially at her knee- and ankle-joints; there was marked exaggeration of the tendon reflexes, and on the left side ankle-clonus. These phenomena continued for a time, the left leg being worse than the other. Ankle-clonus was obtained later on the right side, which also was somewhat more numb than the other.

On February 3 it was observed that the facial paralysis had increased; although when laughing the right angle of the mouth was still drawn up, at least as much as the left; but it was also noticed that there were frequent twitchings of the left angle of the mouth. These twitchings continued; and about the 20th it was noted that she had also occasional twitchings in the left eyelids, and slight tremors in the left hand.

She had complained for a short time that her eyesight was not so clear as it had been, and on March 1 this was again carefully tested. At that time the ocular paralyses remained; the fields of vision were as before; and the discs were quite clear, but doubtfully pale. But now she was colour-blind. She could not distinguish greens, or reds, and confounded them with brown, and sometimes with grey. Bright yellow was called white. Bright blue and lilac were both called dark blue. She was sure also that her vision was in other respects worse than it had been.

On March 30, after she had been suffering for a day or two from much more intense pain than usual, she for the first time complained of a feeling of pins and needles in the right hand and arm, and of pain in the right shoulder. The arm also became weak, and in the course of a week or two slightly flexed at the several joints, the fingers especially suffering; and she had more or less pain from the shoulder downwards. This paralytic affection of the arm was never complete, but attained its maximum towards the end of April.

During the greater part of the time terminating with the last date, the patient had on the whole been getting slowly but steadily worse; the pain in the head (which varied in position, but became more and more localised in the neighbourhood of the back part of the left parietal bone, as time went on) was constant, but liable to severe exacerbations; the sense of nausea on the slightest movement continued; and from time to time (as has been shown) additional paralytic phenomena arose. Nevertheless during the month of April some favourable indications were manifested. On the 11th she saw singly for the first time since admission. And on the 15th the following note was taken: 'Has not seen double

since the 11th, and now the movements of the eyes appear to be perfect. She distinguishes colours better than she did a little while back; she recognises bright greens and blues, but calls red black, and yellow dirty-white. There is still nystagmus when looking to the extreme left. Also there seems some improvement in the facial palsy; at any rate she closes her eye better than she did, and says that the right side of the face is less stiff. Complains that left side of head is heavier than right.' From this time forward there was no return of double vision; and her power of appreciating colours was slowly restored.

Late in April, or early in May, the patient began to improve decidedly. She still suffered from intense headache, giddiness, and nausea; but the attacks were not so frequent; and intermissions occurred, which became longer and longer. Her appetite was better and she felt stronger. About the 10th or 11th of May she began to sit up for a few hours in the evening; and a week or two later got up in the afternoons, and even began to walk about with assistance. It remains only to add, that her various paralytic symptoms gradually cleared up; and that, when she left the hospital on June 4, there were scarcely any traces of nausea or headache, the right facial nerve was not visibly paralysed (although she said that side of the face was still stiff, and that there was still a little difficulty in retaining fluids within the lips), the right hand and arm had almost completely recovered their power, and could be used freely, there had been no starting in the legs for some weeks, and (though the right leg was still somewhat stiff) she could walk well.

She went for a month to a convalescent home; at the end of which time she presented herself for examination. She then seemed quite well, and expressed herself as being able to resume her occupation. There were no discoverable signs of paralysis, and her appreciation of colours was entirely restored. I saw her some months later, and she remained well. I may add that there was a little twitching about the left angle of the mouth. I think it probable, however, that this was an old affair.

During the greater part of the patient's illness her temperature varied between 99° and 100° ; but occasionally it rose to between 101° and 102° , and more frequently descended to the normal. I cannot say that it improved materially as her condition improved in other respects.

The treatment adopted was mainly the subcutaneous injection of morphia, repeated often two or three times a day, for the relief of headache; and the occasional use of leeches behind the ears (the

application of which was usually followed by benefit), of blisters and of ice.

For the first week or two I prescribed 5 grains of iodide of potassium, and 40 minims of solution of perchloride of mercury, to be taken three times a day. Then this was replaced for a time by bromide of potassium, in 20-grain doses. Then she was treated, for reasons not referred to in the above notes, at one time with some stomachic mixture, at another time with some cough mixture. The iodide of potassium and mercury were resumed on April 15, and continued until she left.

What was the matter with this patient? Had she a tumour of the brain? Many of her symptoms—her localised headache, giddiness and nausea—and their rapid extension, suggested this explanation. But the absence of optic neuritis, and her final recovery, seemed to negative this view. Was her disease a functional one merely? I think a decided 'no' may be answered to this question. There was no history of hysteria; and she was not at all emotional. Moreover, the character of the symptoms and their mode of development were not in accordance with one's experience of mere functional disorder. That her symptoms could not have been due to obstruction of arteries with consequent softening of some limited tract of brain-tissue, or to hæmorrhage, is clear from the fact that their development extended over three or four months. In many respects her case presented a close analogy to cases of ophthalmoplegia, presumably due to degenerative changes, or chronic inflammatory processes. In these we not unfrequently observe headache, giddiness, sickness, and (besides the paralysis of the eye-muscles) various other paralyses, anæsthesia of limited distribution, and involvement of one or more of the special senses, without optic neuritis. But these cases, so far as I know them, are of much slower progress than hers, and do not tend to recover. I do not see, however, why such cases should not occasionally improve or even recover; and on the whole I lean to the opinion that, in this patient's case, the symptoms were really due to some subacute progressive inflammatory process taking its origin somewhere about the floor of the fourth ventricle, and spreading thence in depth and surface. Her recovery under the use

of iodide of potassium and mercury suggests a syphilitic origin to her symptoms. I never dared myself to ask her whether she had had this disease. She was a very healthy-looking woman ; there was no lump or scar or stain about her body to suggest that she had ever had anything of the kind ; and her demeanour was such as to disarm suspicion. Nevertheless the possibility of the affection being syphilitic cannot be altogether excluded from consideration.

X.

ON SPEEDY RECOVERY FROM THE EFFECTS
OF CEREBRAL EMBOLISM.¹

ABSOLUTE recovery from the effects of embolic blocking of any of the larger arteries of the brain is, for reasons which are well understood, scarcely to be hoped for in any case that comes under treatment, and must certainly be of very rare occurrence. With respect to the similar obstruction of any of the cerebral arterioles, which supply only minute districts, the conditions are different; inasmuch as, although these vessels are still without anastomoses, and serious, though limited, disturbance of circulation must necessarily be the immediate consequence of the accident, it is possible that the circulation may be restored and maintained efficiently, through capillary connection with adjoining arterial districts.

The cases which follow exemplify, I believe, both of these occurrences.

In the first case, the patient, who had been under my care on and off for years with heart-disease, the result of rheumatism, was attacked suddenly with the usual symptoms of obstruction of the left middle cerebral artery, namely right hemiplegia and aphasia. Looking to the facts, there could be no reasonable doubt that her paralysis was due to embolism; and the medical man who was called in took this view, and formed an unfavourable prognosis. But she recovered perfectly in the course of a few hours, and remained free from all trace of paralysis for over four months; at the end of which time she had another attack, presumably due to re-obstruction of the same artery, which left her permanently crippled. I do not see how anything save an embolus can have caused her first seizure; and the only suggestion I can offer to explain

¹ *Brain*, April 1888.

her recovery is that the embolus was a loose friable mass, which, after it became lodged, broke down into minute fragments, and was thus dispersed.

CASE 1.—*Heart-disease from rheumatism, followed by temporary right-sided hemiplegia and aphasia, and four months later by permanent right-sided hemiplegia with temporary aphasia.*

A. L., a married woman, aged 25, was admitted on January 11, 1887. She first had rheumatism some seven years ago; and since then has been several times in the hospital under my care for heart-disease, and has frequently also come to see me as an out-patient. During all this period she has had a double mitral murmur; and from time to time has suffered from dropsy and hæmoptysis, from which, with rest, she has each time recovered.

About four months ago she came to me, apparently in her ordinary state of health, and suffering neither from dropsy nor from spitting of blood, to get my advice in reference to some symptoms which she had lately experienced. The following is the account she gave of herself. About a fortnight previously, her husband, whose occupation compels him to get up very early in the morning, went to his work as usual at about four o'clock, leaving her in bed. Between seven and eight o'clock she rose, feeling fairly well; but almost immediately afterwards fell down, paralysed on the right side and unable to speak. She lay helpless on the floor for half-an-hour or more, until the landlady of the house in which she lodged, attracted by her moaning, came to the room. A medical man was at once fetched, who recognised that she had right-sided hemiplegia with aphasia, assumed it was due to embolism, and foretold an unfavourable issue. The right arm and leg were absolutely powerless, the mouth was drawn to the left, and she was unable to utter any articulate sound. But she retained her consciousness. The symptoms continued without change for three or four hours, and then subsided. And on the occasion of her visit to me there remained no trace whatever of paralysis, her speech was perfect, and she was (as stated above) apparently in her usual state of health. The medical man referred to subsequently, in a letter, confirmed the substantial truth of the above narrative.

She continued in her usual health until a week before admission; when, on waking in the morning, she again found herself paralysed on the right side, and unable to speak. During this week her speech became almost perfectly restored; but the paralysis underwent no change.

State on Admission.—A spare, interesting-looking young woman, suffering from well-marked right hemiplegia, without loss of feeling. The right arm and leg were absolutely motionless; the mouth was symmetrical when at rest, but drawn to the left when she showed her teeth or smiled; the tongue was protruded to the right; and the right palpebral fissure was usually a little more open than the left. The tendon and superficial reflexes were natural. Her articulation was not perfect; and she was a little slow at speaking, as if her words did not come quite readily. Moreover, there was an occasional slip in naming things; thus she called an ink-stand, an ink-pot or ink-can. For the most part, however, her words were correctly applied. The heart's apex beat in the sixth space, an inch outside the nipple line. Its action was somewhat irregular. There was a loud, harsh, systolic, and a well-marked præ-systolic, murmur, chiefly audible at the apex. In all other respects she was fairly well.

She remained in the hospital until April 17; and during her stay there was, up to a certain point, marked improvement in her cerebral symptoms. For a few weeks she still presented slight impairment of articulation, and unreadiness in naming; but during the latter part of the time her speech became perfect. Moreover she could read; and was able (though with awkward formation of letters) to write with her left hand. The slight facial and lingual paralysis gradually disappeared. Her leg improved slowly, and before she left the hospital she could pretty readily flex and extend the hip, knee, and ankle joints, but still could not move her toes, or walk. She did not regain any use of the right fingers, hand, or forearm; but to some extent recovered the power of moving her arm at the shoulder-joint. After she had been in the hospital about a week, the tendon-reflexes in the right arm and leg had become exaggerated, with development of ankle-clonus, and the superficial reflexes had diminished. These phenomena continued thenceforth. It may be added that on several occasions it was noticed that when she yawned, the right hand and its third and fourth fingers became involuntarily extended.

Occasionally during her sojourn in the hospital she suffered from symptoms referrible to the heart; and occasionally also abnormal cardiac sounds were heard which, it was thought, pointed to affection of the tricuspid valve. But no other incident calling for notice occurred.

The second case was that of a woman who was under Dr. Stone's care, and whom I had the opportunity of examining.

from time to time. She was admitted with mitral-valve disease of old standing; and while under observation in the hospital had sudden obstruction of the abdominal aorta and left radial artery. She presented the characteristic phenomena and consequences of such obstructions, but so far recovered as to be able after a time to leave the hospital, still with incomplete restoration of the affected limbs, yet feeling on the whole fairly well. There can be little doubt that these sudden arterial obstructions were embolic. The case is chiefly interesting for the reasons above given. I quote it, however, on other grounds. Eight or nine days before she was discharged, and at a time when she had in great measure recovered from her more serious symptoms, she was attacked with paralysis of the left internal rectus, of the right facial nerve, and of the right external and internal recti, with dilatation of the right pupil, vomiting, and fall of temperature. The fundi of the eyes remained normal. Having regard to the facts, that the patient had heart-disease of rheumatic origin, and that she had recently had sudden obstruction of the aorta and of the radial, it is scarcely possible to doubt that this last attack of paralysis was due to a minute cardiac embolus causing obstruction of some arteriole, supplying a small district of the right crus cerebri and adjoining pons. In the course of a few days all the paralytic and other symptoms due to the accident had disappeared absolutely.

CASE 2.—Mitral disease ; sudden obstruction of aorta with disappearance of pulsation from abdominal aorta and arteries of both lower extremities and of left forearm ; paralysis of legs ; temporary suppression of urine. Partial recovery, followed by paralysis of certain muscles of eyes and right facial nerve, of short duration.

C. M., a married woman, age 33, was admitted under Dr. Stone's care, on February 4, 1883.

She had rheumatic fever seventeen years previously, but never any second attack; has had five children, of whom two have died, and the youngest is 9 years old; has been in poor health for the last eight or nine years; and has suffered latterly from dyspnoea, cough, and pain in the region of the heart.

It was for these symptoms she was admitted. And, on examina-

tion, the heart seemed little if at all enlarged or displaced; but there was a distinct præ systolic thrill and murmur at the apex; there was no dropsy, or albuminuria, and only a little crepitation at the bases of the lungs.

During the early part of the 6th, she had some numbness in the feet, and in the afternoon complained of severe pain about the heart, and faintness. About 5 p.m. she had a sudden pain below the left ribs, and vomited immediately afterwards.

The next day the pain, faintness, and sickness had ceased; but the feet were cold; there was no pulsation in the abdominal aorta or in the main arteries of the lower extremities; she could flex the knees, but could not move either the ankles or the toes; there was loss of sensation from the knees downwards; the superficial reflexes were absent, and the patellar tendon-reflex was deficient in the right lower limb, where also there was a burning, gnawing sensation. Later in the day, it was discovered that there was no pulsation in the left radial. She was anxious-looking; her pulse was 80, full; and the heart's sounds remained as before. The temperature rose to 100.2° .

After this, the condition of the patient underwent very little change for some time, but on the whole improved decidedly. The heart's action was not rapid, but was inclined to be irregular; the legs remained weak, but she recovered some power over the movements of her toes, not of her ankles; sensation returned to a considerable extent, but there still remained some numbness of the feet; the patellar tendon-reflex remained absent from the right leg; no pulsation was ever detected in the abdominal aorta, but it was fancied from time to time that it could be felt in the arteries of the lower limbs, and in those of the left forearm; some superficial patches of gangrene appeared on both legs, but remained of small size. It may be added that, for a day or two after the onset of severe symptoms, the urine was almost entirely suppressed, and she suffered from drowsiness.

At the end of March her condition was much better than could have been hoped for. She looked well, was free from pain, and cheerful; and she had recovered to a considerable extent the use of her legs and left arm; but the former were still weak, the pulsation in the formerly obstructed vessels was very feeble and often undiscernible, and the cardiac sounds and action were in the same state as when she was admitted.

On March 31, however, the patient felt ill, and on April 1 she complained of diplopia. The right pupil was dilated; there was weakness of both external recti, of right internal rectus, and also

of right facial. She had vomited once; and her temperature had sunk to 95°.

On the 2nd the pupils were equal, but the diplopia continued, the weakness now being apparently limited to the right internal rectus, the left external rectus, and the right facial. She vomited frequently during the day. Her temperature remained low. After this, the paralytic symptoms about the face gradually disappeared; the sickness subsided; and she returned to the condition in which she was prior to March 30. The eyes, examined by the ophthalmoscope, were said to be healthy; her temperature remained subnormal.

She left the hospital, at her own request, on April 7; the circulation in the affected limbs being still imperfect, her power over the legs still incomplete, and her ability to walk still impaired.

The next case I take to be of the same kind as the one last narrated. But the symptoms were milder and the evidence of embolism less clear.

CASE 3.—*Temporary tendency to cross paralysis of the face, due probably to embolism.*

A young medical man, who had had two attacks of acute rheumatism, of which the last had occurred eight years previously, and who had suffered ever since he was a child from megrim, consulted me about himself in November, 1879. With the exceptions above specified he had generally enjoyed good health, and he had never had syphilis. But for three or four months he had been somewhat out of sorts, and had slept badly. The day before he called upon me, while sitting in his chair, he experienced a strong sensation of warmth, with tension, on the right side of the face. He at once got up, dipped his face in water; and then, on looking at himself in the glass, discovered that he was very pale, that his sight was confused, that he had slight double vision (with, as his account seemed to show, some obliquity), and that his left pupil was dilated to the full, and inactive to light and accommodation. He was a little tottery in his walk. But he was quite himself, had no sensory disturbances, was wholly free from paralytic weakness of face or limbs, and was not aphasic. Headache, referrible to the left side of the head, followed. These symptoms continued during the remainder of the day; he passed a restless night; and the following morning he found that his pupils were equal and natural, and his squint was gone. When I saw him in the afternoon he still felt

a little shaky ; but all the other special symptoms had subsided. On examination of the heart, I detected a very slight systolic murmur audible at the apex, only at the end of a deep inspiration, and inaudible behind. I concluded that the heart was mechanically healthy ; but suspected, from his history and recent attack, that there were a few granulations on the auricular aspect of the mitral valve. The patient is still in good health. The sensory affection of the right side of the face, combined with the dilatation of the left pupil and double vision, led me to conclude that the lesion causing his symptoms was in the neighbourhood of the pons. And, from the rheumatic history and temporary character of the attack, I attributed it to a small embolus lodged in one of the vessels of this part. The case, at any rate, has a close resemblance to the last. I need scarcely add that there must have been paralysis of one or more of the ocular muscles, but of which there was no evidence.

POSTSCRIPT.—It is very curious how apt we are to overlook interesting facts that come under our very eyes unless we are actually on the look-out for them ; and how, if our attention is specially directed to them, incidents, which had seemed of rare occurrence and mere curiosities, seem to become comparatively common. The cases which I have narrated in the foregoing paper, were absolutely, at the time I wrote the paper, the only examples of recovery from cerebral embolism which had come under my personal observation. Yet recently a case not unlike that of A. L. has been admitted under the care of one of my colleagues ; and two other cases have come to my knowledge which I think may fairly be assumed to furnish typical examples of the same phenomenon.

Of the latter two cases one is at present in the hospital under my care, the other has been mentioned to me by Dr. Philip Frank. My patient is an intelligent man, a gardener, 65 years of age, who was admitted with a mitral systolic murmur, ascites dependent on portal obstruction, and œdema of the lower extremities. He had an attack of acute rheumatism when he was 17 years of age, at which time his heart suffered, and there can be no doubt that the mitral disease dates from this attack. Nevertheless he worked hard, without discomfort, up to seven years ago ; and his retirement at that time was

not wholly due to his heart-affection. The ascites has only come on recently. He states that, when he was between 35 and 40 years of age, he had a sudden attack of right-sided paralysis, involving arm, leg, and face; that he was speechless for some hours, and that the paralysis disappeared completely in the course of a week or two; and that within a month of this attack he had another sudden seizure, in which his left side became paralysed, but that the paralysis on this occasion lasted only for a day or two, and was unattended with loss of speech. He has never had any recurrence, and at present shows no traces whatever of either of these accidents. Dr. Frank's case was that of a lady who was his patient some years ago. She was suffering from heart-disease of rheumatic origin, and she (like my patient) had within a short time two attacks of hemiplegia, one affecting the right side, one the left, both of which came on suddenly and from both of which her recovery was complete.

August 10, 1888.

XI.

ON RECOVERY FROM IDIOPATHIC CEREBRO-SPINAL MENINGITIS.¹

INFLAMMATION of the membranes of the brain is usually and rightly regarded as a very formidable and fatal disease. Yet even in that deadly variety of it in which the inflammation depends on the presence of tubercles, there is reason to believe that recovery (probably only temporary) occasionally takes place; and there can be no doubt that in the idiopathic affection the prospects of cure, though still gloomy, are sufficiently good to encourage careful and watchful treatment, and to justify hope even in cases that seem to be doing badly.

Of course in cases of suspected meningitis which recover, and where one's diagnosis rests only on symptoms, it is always possible to argue that these have been misinterpreted; and with the more plausibility in most such cases, because the symptoms have for the most part been not only milder, but less distinctive, than they usually are in cases that prove fatal.

I have already, elsewhere, adduced evidence in favour of the possibility of recovery from symptoms of meningeal inflammation due to the presence of tubercles. I propose in my present paper to bring forward cases illustrative of the cure of (or perhaps rather recovery from) meningitis of idiopathic origin.

By a curious coincidence, of which examples are frequently met with in the course of practice, three cases of what I regard as idiopathic or sporadic cerebro-spinal meningitis have come under my care, in hospital practice, during the last eighteen months. Of these, two recovered, and one (the last) died.

¹ *Brain*, July, 1888.

I add this last case because it tends to confirm the correctness of the diagnosis made in the other two; inasmuch as, while it was almost identical with them in symptoms, at the autopsy well-marked meningitis (unassociated with tubercle) was found.

CASE 1.—*Cerebro-spinal meningitis. Recovery.*

M., aged 26, a riveter, was admitted under my care on July 8, 1886. He had been quite well up to the 3rd of the month; on the morning of which day, while dressing, he felt a sharp pain at the back of his head. He went to work as usual; but in a short time was again suddenly seized with violent pain in the same situation, attended on this occasion with nausea. He tried to go out of the workshop into the open air, but would have fallen had he not been supported; and he vomited. He does not think he lost consciousness. He was then taken home and put to bed, where he remained until his removal to the hospital. During this time he suffered from almost continuous severe occipital pain, retraction of the head with inability (from pain) to bring it into the natural position, nausea and constipation. There was no history of syphilis, rheumatism, or indeed of any serious illness.

State on Admission.—The patient is a slightly-built man, complaining of great pain in the head, which, he says, is now general, and occasionally shoots down the neck and into the shoulders. The head is strongly retracted and kept rigidly in that position; and there is tenderness on pressure over the spines of the upper two or three cervical vertebræ. There is no affection of the ears. The pupils are not quite equal, but both act well to light and accommodation. There is no oculo-motor paralysis; and the fundi are normal. No trace of paralysis or loss of feeling is present in trunk, face, arms, or legs. But the knee-jerks are brisk, and there is slight ankle-clonus. He is quite sensible.

No disease is discoverable in the chest or abdomen. The tongue is coated, the appetite bad, the bowels confined; the urine has a specific gravity of 1080, and is free from albumen; pulse 76, respirations 32. The temperature during the first day varied between 100° and 100·6°.

There was no great change in the patient's condition during the next four days. During this time there was still much retraction of the head, with more or less constant pain in it, and tenderness over the upper cervical vertebræ; his temperature, though tending to fall, and occasionally normal, usually oscillated between 99° and

100.4°; his bowels continued inactive; and his pulse varied between 54 and 65. But he suffered from occasional paroxysms of very intense pain, confined chiefly to the back of the head, attended with groaning and cries of distress, and lasting from two to three hours or more at a time. These paroxysmal pains at times extended down the neck and arms; and on one occasion were most severe in the sacral region and along the thighs. The attacks usually came on without obvious cause; but once or twice were evidently induced either by attempts to bend the patient's head, or by making him sit up for the purpose of examination. It was observed also that there was much tenderness, apparently in the right sterno-mastoid itself at the level of the cricoid cartilage. He did not vomit; he remained quite sensible, and (except when suffering from severe pain) slept fairly well. On the 11th, twelve leeches were applied behind his ears.

From the 13th to the 17th there was progressive amendment. He still had occasional attacks of pain, but they were much less severe than they had been; he still complained of tenderness in the cervical spine and right sterno-mastoid, but they were diminishing; and he became able to move his head, so that on the 17th he could bring his chin to within two inches of the sternum. The pulse was still inclined to be slow, and the temperature (which was generally subnormal) ranged from 96.4° to 99°. The optic discs were healthy. On the 17th he got up for the first time.

On the 18th, 19th, and 20th he continued, on the whole, to gain ground; but he still suffered from paroxysms of headache, and on the morning of the 20th had an attack of some severity, which lasted for about two hours. His temperature, however, continued subnormal; and the movements of his head were becoming more free. Some tenderness remained in the right sterno-mastoid, and tenderness also was noticed in the left.

With the exception of the occurrence of a not very severe attack of frontal headache early in the morning of the 27th, no incident worthy of notice was observed during the remainder of his stay in the hospital. He gradually lost all trace of headache and of stiffness and pain in the neck, and he was discharged apparently well on August 2. During his stay in the hospital he was treated with iodide of potassium and mercury.

CASE 2.—*Cerebro-spinal meningitis. Recovery.*

George D., a porter, 19 years of age, came under my care on June 23, 1887. He stated that he had had good health until the

previous Easter, since when (although he had had no definite symptoms of illness) he had not felt quite well.

He had for some days been much exposed to the sun, when (on the 19th) he woke up with a severe headache, which (attended with vomiting) continued throughout the day. From that time to the day of admission his headache had not left him; he had been so giddy as to be unable to walk, and occasionally he had seen double. His appetite had been bad, his bowels confined.

State on Admission.—He was a somewhat spare and delicate-looking youth. His face was flushed, his lips dry. His head was held rather rigidly, and there was pain on movement. The pupils were dilated, but equal, and acted freely to light and accommodation. Neither eye could quite reach the outer canthus; but the left external rectus appeared to be the weaker. He saw double, especially when looking at distant objects or to the left. The optic discs were normal. The tongue, which was thickly coated, was protruded slightly to the left. There was no other paralysis, and no impairment of sensation; the tendon-reflexes were normal, and he was perfectly sensible. The thoracic and abdominal viscera were apparently all healthy. Pulse 60. Urine, sp. gr. 1004, presenting a trace of albumen. Skin hot and dry. The temperature varied from 101.2° to 101.8° .

For the next twelve days the patient's condition underwent but little change. His headache, which was chiefly frontal, continued, and was liable to occasional severe exacerbations, and at times the pain extended down the back. The head, too, though not retracted, was held rigidly; and he complained of some tenderness in the muscles of the back of the neck. The weakness of the left external rectus continued, with double vision when looking at distant objects or to the left; and nystagmus was observed when the eyes were turned strongly to the right or left. The tongue still pointed to the left when protruded. The arms and legs remained unaffected; but slight ankle-clonus appeared on both sides. His temperature was irregular, and varied from 97.4° to 102.8° ; each access of severe pain being attended with a rise. He had no recurrence of sickness during this time; his optic discs remained normal; he had no convulsions or delusions, and he retained his intelligence.

During the next month there was, on the whole, improvement. The temperature for the most part was normal or subnormal, and the headache was less constant and less severe. But, at irregular intervals of a few days, the temperature would rise to 100° or 101° ; and such rises were attended with more or less severe pain in the head, which at times extended down the back, and on several occasions

down the left arm to the fingers. Moreover, during this period, he was not unfrequently sick, the sickness occurring chiefly in association with the cephalalgia. The squint, nystagmus, and tendency to ankle-clonus continued. But the weakness of the left side of the tongue disappeared; and the stiffness of the neck subsided. His eyes were examined at the end of July by Mr. Nettleship, who reported that the right optic disc was then swollen and hazy; and that, although the left disc was less affected than the other, it was also everywhere more or less hazy.

During the first six days of August, he suffered a good deal from attacks of headache, attended with extension of pain to left shoulder and arm, sickness, and febrile temperature. But after this his improvement was almost uninterrupted. His temperature, with only one or two exceptions, remained normal or subnormal; he lost his headache and sickness (excepting on these one or two occasions), his nystagmus, double vision, and ankle-clonus; his appetite became good; he was no longer confined to bed; and for the most part he felt, and seemed, in good health. The optic discs were re-examined a day or two before he left the hospital; and, although both presented evidences of neuritis, they were manifestly improving.

He went, on September 8, to a convalescent home, where he remained a month, and whence he returned apparently well.

During the first week the patient twice had six leeches applied behind the ears, and a few days later a blister to the nape of the neck. Up to August 5, he was treated with iodide of potassium and mercury; subsequently to that date with quinine and iron. On one or two occasions opiates or other sedatives were given to relieve pain.

CASE 3.—*Cerebro-spinal meningitis. Death. Autopsy.*

E. P., a boy of 13, was admitted on December 5, 1887. A fortnight previously he had come home from school complaining of pain in the back and head. From that time he had kept his bed, suffering from headache, loss of appetite, sickness, retraction of the head, and so much general tenderness that he screamed whenever he was moved. He had been delirious and noisy at times. But he had never lost consciousness or suffered from fits.

State on Admission.—He was a thin boy, with a pinched expression, and strongly retracted head, complaining of pain in the head and back of the neck, and of pain in the eyes when they were exposed to strong light. He was somewhat stupid and confused, and inclined to ramble in his talk; but, when spoken to with decision, answered

questions and did what he was told to do. His eyes were kept closed; the pupils were dilated and equal, and acted to light. There was no obvious oculo-motor palsy. His head and spine and thorax were hyperæsthetic. There was no sign of paralysis anywhere. The skin was harsh and dry; no *tache cérébrale* could be obtained. His lips were dry, his tongue thickly coated, and he appeared to have some difficulty in swallowing. The abdominal and thoracic viscera were apparently all healthy. Pulse, 80; respirations, 20; temperature varying between 100° and 101°. Urine passed unconsciously. Bowels constipated.

For the next three days his condition remained much the same as on admission. His temperature varied every day from about 99·4° to 100° or 101°, and his pulse from 80 to 140. He took little food by the mouth, and seemed to have difficulty in swallowing, but was not sick; and he had to be fed mainly by the rectum. The retraction of the head and hyperæsthesia continued; he had delusions at times and was apt to be noisy; he complained of pain in the eyes, and in the back of the head and neck; he passed his evacuations into the bed. It was thought that there was a little weakness of the right external rectus. During the greater part of the time, he lay quietly, but resented interference.

In the course of the 9th, his temperature fell to the normal and from that time to the 14th inclusive it never rose above 98·4° and was generally subnormal, occasionally falling to 96·4°. During this period, there was, on the whole, marked improvement; he was still noisy and restless at times, and at times inclined to be drowsy; and his pulse continued variable, and for the most part rapid. But he was sensible, and answered questions correctly; his head (though still occasionally retracted) assumed for the most part the normal position; his difficulty of swallowing subsided, and although he still objected to food, he was latterly fed wholly by the mouth; and he ceased to pass his evacuations incontinently. His tongue was still coated, his breath offensive; his urine was free from albumen.

On the 15th his temperature rose. In the early morning it was 100·2°, and at 9 A.M. 102·2°; and it varied between 102° and 102·6° during the rest of the day. In the morning he was quite rational, but was sick and complained of great pain in the head, and had again lost control over his evacuations. His pulse was rapid (154); his pupils were dilated and equal; there was no strabismus. No retraction of the head was observed early in the day, but it came on strongly later.

During the greater part of the 16th, the temperature varied

from 100.2° to 101.4° ; but at 8 P.M. it had fallen to 99.8° . He had been very noisy during the night, but became drowsy and difficult to rouse in the course of the day; and, when roused, said that he felt worse and had pains all over him. He took food well, but vomited two or three times. His tongue had again become dry and brown, and his lips covered with sordes. Pupils normal. Pulse 124.

From the 17th to the 21st inclusive the temperature again was either normal or subnormal; and again there was marked improvement. He was very drowsy for the first day or two; but he became perfectly intelligent, answering questions readily; he lost his cephalalgia, retraction of head and sickness; he took food fairly well; and recovered control over his evacuations. His pulse was usually about 120. On the 21st he complained of pain in one of his feet.

From the 22nd to the 27th there was again some elevation of temperature, which varied for the most part between 99.4° and 100.8° , but on the 24th rose to 102.2° . During this time, his symptoms varied somewhat; but he was evidently not so well as he had been. He complained at times of frontal headache, and at times was free from pain; his head was occasionally strongly retracted, but on the whole was freely movable; he was sick once or twice; he was generally irritable, and disinclined to answer questions or to take food; his tongue was inclined to be dry; his pulse was generally over 120; for the most part he had control over his evacuations. He had never previously allowed his eyes to be tested ophthalmologically, but now these were carefully examined on two occasions, and the fundi were found to be perfectly normal.

From this time until January 10th, there was no very great change in his symptoms, excepting that his emaciation and weakness, which had been progressively increasing since admission, became extreme, and he passed into a condition of apathy, in which he seemed to know and occasionally to observe what was going on, but for the most part vouchsafed no reply to questions save an occasional nod, and practically refused all nourishment. He looked intelligent; did not appear to suffer any pain in the head or elsewhere, although when he was moved or washed he would cry out and resent what was being done; lay for the most part on his back without any retraction of the head; and passed his evacuations without any attempt to control them. He had to be fed through the nose, and was occasionally sick. He suffered from no attacks of unconsciousness or fits, and no signs of paralysis were detected. It may be added that his tendon-reflexes were normal. During all this time his temperature fluctuated: for a day or two being

normal or subnormal; and then for a day or two varying between 99° and 101° , or a little over. His pulse was generally quick, and on one occasion was counted 160 in the minute. Although in many respects the symptoms, and more especially those which seemed to be directly due to cerebro-spinal disease, appeared latterly to have undergone decided amelioration, it was quite clear that the patient was slowly and surely sinking from sheer debility.

The treatment consisted mainly in the occasional exhibition of calomel purges, and application of leeches or blisters to the temples or behind the ears; together with the employment of iodide of potassium and mercury during the first ten days, and of quinine during the next fourteen days, and again of iodide of potassium and mercury during the last eight or nine days.

During the greater part of the 11th no change was observed. At 6 P.M. his temperature was found to be 103.2° ; and a quarter of an hour later he had a convulsive fit, which lasted about two minutes. He never regained consciousness. At 8 P.M. his temperature was 100.4° ; between 8 and 9 he had two more slight convulsive attacks. At 11 P.M. his temperature was 106.2° . He died at 3.30 the following morning. His temperature immediately after death was 108.6 .

Autopsy.—The corpse was extremely emaciated. All the thoracic and abdominal viscera were healthy, and free from tubercles. On opening the cranial cavity, the surface of the brain was seen to be dry, and the convolutions flattened. There was an abundant exudation of soft opaque lymph covering the under surface of the pons Varolii, medulla oblongata, and cerebellum, and extending forwards so as slightly to involve the optic commissure. But there was no inflammatory exudation either in the anterior or middle fossæ or along the Sylvian fissures. The lateral ventricles contained four or five ounces of serum, and the commissures were softened. But generally the substance of the encephalon was healthy. There were no tubercles, no disease of bone, no affection of venous sinuses or of arteries. There were slight traces of inflammation of the membranes of the upper part of the cord; but the cord itself and the vertebral column were healthy.

It will be readily admitted, I think, that the symptoms in all these cases were such as are apt to attend, and are fairly distinctive of, meningitis of the base of the brain and upper part of the cord. The patients all presented headache (not necessarily limited to the back of the head); retraction of the

head, or rigidity of the neck, with pain and tenderness at the back of the neck; pain shooting down the spine and into the limbs, or general hyperæsthesia, and remittent febrile attacks, usually attended with aggravation of headache and sickness.

But the symptoms of meningitis are always very variable; and it is not surprising, therefore, that some of the symptoms frequently met with were absent from one or other of the cases, or but slightly marked, and that consequently, as to details, the cases differed a good deal among themselves.

None of them presented any paralysis of limbs; but in the first two slight ankle-clonus was observed temporarily. In the last it was not detected; but this may have been due to the fact that the patient always complained of pain when the feet were handled, and thus prevented examination.

In the second case, there was paralysis of one of the external recti with double vision; in the third, at one time it was thought that one of the same muscles acted imperfectly; in the first, slight inequality of pupils was noted. But with these exceptions there was no oculo-motor paralysis. For the most part the fundi of the eyes were healthy. In the first case, no optic neuritis was discovered. In the second case (which was under treatment for eleven weeks), slight optic neuritis became apparent at the end of five or six weeks, but had nearly subsided at the time the patient left the hospital. In the third case, the eyes were examined four or five weeks from the onset of the boy's illness, and no optic neuritis was then found. No subsequent examination could be made; so that whether or not it supervened later I cannot say. It is noteworthy that, in the case in which there was an obvious and persistent squint, there was also slight nystagmus. In the first two cases the pulse, though variable, tended to be slow; in the other the pulse was also variable, but usually very rapid. In the last case, although the specific symptoms of meningitis were not more pronounced than in the other two, the illness from the beginning appeared of a graver type; and it is not surprising, therefore, that in this case only were there mental disturbance and loss of control over the evacuations. It is interesting, too, that in this case the specific cerebral symptoms had almost completely subsided for some little time

before death; and that this event appeared to be brought about mainly by progressive innutrition and debility. The peculiar apathetic and passively obstinate frame of mind, which characterised this boy during the last week or two of life, is a curious and interesting feature of some fatal cases of chronic affection of the membranes or surface of the brain.

I am afraid that no definite rules of treatment can be derived from my cases. I believe that leeches and counter-irritants to the temples or behind the ears, and opiates or other sedatives for the relief of pain or restlessness, are often of much value in such cases, and were useful in these. And I am inclined to think that iodide of potassium and mercury are serviceable during the earlier stages, and quinine at a later period, especially if there be signs of amendment. But on the whole I suspect that judicious nursing and attention to small and various details is of more real value than drugs.

POSTSCRIPT.—The following case of basal meningitis has occurred to me since the foregoing paper was written.

CASE 4.—*Meningitis. Recovery.*

William H., 36 years of age, a bricklayer, was admitted under my care on July 4, 1888.

He had been attacked with illness somewhat suddenly about five weeks previously, the symptoms at first consisting mainly of severe pain at the back of the head and neck, and at times between the shoulders. The symptoms had increased in severity, and he seems to have had delusions, and to have been troublesome and forgetful. Latterly there had been improvement.

State on Admission.—A strongly-built man. He is quite sensible, and lies in bed on his back perfectly flat, without a pillow. He complains of pain at the back of the head and neck, and along the spine; and there is some tenderness in the situation of the cervical vertebræ. The pain is aggravated when he endeavours to move his head. He has no sickness, no paralysis or anæsthesia. The pupils are equal and act normally, and the optic discs are healthy. Thoracic and abdominal viscera all sound. Pulse of normal rate, regular; urine free from albumen.

At 2 P.M. on the day of admission, after a warm bath, his temperature was 100.6° . Subsequently it fell to 98.6° ; then rose to 99.6° (his pulse being 96) and remained at this level until 8 A.M. the following morning.

At 8 A.M. on the 5th the pain became very severe in the back of the head and neck, shooting round to the forehead; and it remained severe for some hours; his head at the same time being kept rigidly fixed. At the beginning of the attack the temperature was 99.6° , but by 9 A.M. it had risen to 101.8° . At 4 P.M. it was still 100.2° , after which it fell to the normal. During the attack any attempt to move the head caused aggravation of the pain. He was not sick. Ice was applied, but without much relief.

At 4 A.M. on the 6th the temperature was 97.8° , but at 8 it had risen to 102° , without any notable increase of pain. At 10.30, however, the temperature remaining about the same, he had a recurrence of intense pain in the head and neck, which like the former attack lasted for some hours. At noon the temperature was 102.2° and the pulse 112. The temperature after this fell to 100.2° , and continued at this level till late in the afternoon. At midnight it had become subnormal.

An injection of 10 minims of solution of morphia was given at 11 A.M., and a little later four leeches were applied to the back of the neck.

At 8 P.M. on the 7th the temperature rose to 101.6° , and a morphia injection was administered. He had not much pain on this occasion.

On the evening of the 8th he had another rather severe attack, which was again treated with morphia. The temperature did not rise above 100.2° .

On the 9th and 10th the pain varied, but was not severe; the temperature for the most part was either normal or a degree above, but at noon on the 10th reached 101.2° .

During the morning of the 11th the temperature was subnormal. At 4 P.M. it had risen to 99.6° , and he was attacked with a rigor which lasted half an hour, at the end of which time his temperature had risen to 100.6° . Some pain in the head came on afterwards; this was at its height at 6.45, when a morphia injection was given, with much relief. His temperature rose to 101.6° at 5.30, and during the rest of the evening was stationary at 100° .

On the 12th he remained fairly well, and his temperature on the whole normal. But on the morning of the 13th he had another rigor lasting for half an hour, followed by exacerbation of headache and a rise of temperature to 101.2° . Eight leeches were applied behind the ears.

After this day the temperature never rose above the normal, and was often a degree or two below ; he had no recurrence of rigors or of severe headache ; the pain in the head and neck disappeared absolutely in the course of a day or two ; and he became able to move his head with perfect freedom. From the 17th to the 31st he expressed himself as being quite well, and he seemed so. And on the 31st he was discharged.

It may be added that his tongue was thickly coated with creamy fur during the greater part of the period in which he suffered from headache, and that he had a poor appetite, but was never sick ; that his bowels on the whole were regular ; that his pulse varied between 90 and 120, and was never slow ; and that his eyes were examined just before he left the hospital, when the discs were again found to be healthy.

During the whole period of the patient's stay in the hospital he was treated with iodide of potassium and mercury ; and for the most part, when suffering from pain, with morphia injections.

August 10, 1888.

XII.

STUDIES OF A CASE OF CEREBRAL DISEASE.

1. THROMBOSIS OF THE LATERAL SINUSES.

THE case which forms the basis of the following two papers has interested and puzzled me very much; and not the less so that it presented two groups of phenomena (both indicative of nervous disease) which, though intermingled to some extent, characterised mainly two separate periods of the patient's prolonged and not even yet completed illness, and seemed to depend on different causes. In other words the patient's early symptoms appeared to be due mainly to organic intracranial disease; the later symptoms to be functional or hysterical.

I propose on the present occasion to deal only with the patient's original illness; and proceed in the first instance to give the details of the case as they were recorded while she was under my care in St. Thomas's Hospital.

CASE 1.—*Anæmia; epileptic fits; headache; sickness; optic neuritis; severe pain, first in neighbourhood of right ear, later in neighbourhood of left (thrombosis of lateral sinuses?); phlebitis in leg. Improvement.*

Margaret McH., a governess, 19 years of age, was admitted on October 2, 1886.

For twelve months she had been getting anæmic and had been liable to attacks of fainting. During the previous month, especially, she had been feeling out of sorts, giddy and weak. On the morning of the day of admission she had seven fits in rapid succession, and was brought to the hospital insensible. Six more fits occurred in the course of the first few hours after coming in. They appeared to be true epileptic fits. They came on without cry or other warning, lasted about a minute, were attended with absolute

unconsciousness, insensibility of conjunctivæ, convulsive movements of the muscles of the face, and rigidity of the limbs. But she did not pass her water or bite her tongue. In the intervals between the fits she was quiet, but resented interference. Her temperature rose from 98.8° at 2 P.M., the time of admission, to 102° in the evening; at which time the fits had ceased, and she could be roused, though with difficulty.

She was an anæmic girl, complaining of frontal and occipital headache. She had no paralysis; she did not squint; her pupils were equal and active; her tongue was protruded straight; there was no evidence whatever of disease of any of the thoracic or abdominal viscera. She presented no ovarian tenderness. Her urine had a sp. gr. of 1020, was clear, acid, and free from albumen.

Her condition varied from time to time during the next 12 days. She was generally inclined to be drowsy, and was sometimes difficult to rouse, and at times, even when roused, did not seem to recognise her friends; but she had no recurrence of fits. She generally complained of headache; and was often sick without obvious cause. Her temperature on the 3rd rose to 101.4° ; on the 4th to 101.8° ; on the 5th, 6th, and 7th varied between 99° and 100.8° . But during the following seven days it was generally normal and never exceeded 99.8° . On the whole there was decided improvement during this period.

On the 15th the following notes were taken: 'She was much brighter last night; but this morning is again drowsy and difficult to rouse, and complains that the right side is numb. There is no sign of motor paralysis; nor is there absolute anæsthesia anywhere; but sensation is undoubtedly much impaired on the extensor aspect of the right forearm. The knee-jerks are brisk, and there is ankle and knee clonus on both sides, but chiefly on the right. She has been sick again this morning; and it seems that for a day or two she has been complaining of pain at the back of the neck. Pulse 104. Temperature normal. While being tested, in reference to sensation, she had a kind of fit, unattended with loss of consciousness, in which she shivered all over, and had rapid and shallow breathing. The shivering was arrested temporarily by firm pressure in the left ovarian region. While the attack was on her, she suffered from much pain in the right arm.'

On the 16th her general condition was better, and the anæsthesia had disappeared; but she complained of frontal headache, and of acute pain, referred to the right ear. The pain became very severe towards the evening; but with the aid of 30 grains of bromide of potassium she had a fair night.

On the 17th the pain in the ear was evidently intense; she was constantly crying out or groaning, and keeping her hand to her ear. There was no deafness; no discharge; but her temperature, for the first time for some days, exceeded 100° in the morning; and there was a tender gland about the size of a pea near the right angle of the jaw. Six leeches were applied behind the ear; and she had in the evening a hypodermic injection of $\frac{1}{4}$ of a grain of morphia.

18th.—Slept well. Still has much pain in the ear, which is tender and difficult of examination. But there is also pain and tenderness and some fulness in the soft tissues immediately below the ear. She is still sick at times; indeed, the sickness has never wholly subsided. The temperature at noon to-day was 102.2° .

On the 19th the temperature had fallen again (its highest elevation, 101° , occurred in the morning); and on the whole she was better. She was quite sensible, as she had been for some days. Her earache was better; and she had no discharge; but could only hear a watch when placed close to the ear. There was no visible disease whatever within the ear; but there was much tenderness and some swelling of the tissues below the ear, to nearly half-way between the ear and clavicle. The position of the swelling and tenderness suggested thrombosis of the internal jugular vein. To-day her eyes were examined by Mr. Nettleship, who reported as follows:—‘Disks hazy, grey, moderately swollen, veins distended. Changes rather more in left, where one vessel is streaked with white. No hæmorrhages seen. Second stage of moderate cerebral papillitis.’

From this time the pain and swelling about the ear and neck gradually subsided; and by the 22nd she was, so far as this complication was concerned, practically well. There was still a little fulness behind the ramus of the jaw; but she had no pain, her temperature was normal, she had slept well, and was quite sensible. She got up to-day for the first time since admission.

The next day, the 23rd, she vomited a good deal, and had much headache. And on the 24th she complained of pain in the left side of the neck, referred to the upper part, just below and behind the sterno-mastoid. There was a good deal of tenderness, and a little fulness was observed the next day. The pain was of the same nature as that which had occurred on the right side, but much less severe; and the swelling and tenderness occupied very nearly the corresponding region to that originally occupied by the affection of the other side. There was no deafness, no discharge from the ear, no rise of temperature, and the symptoms all subsided in the course of two or three days.

On the 27th the patient was much better in all respects ; had scarcely any headache, was bright and intelligent, and was reading in bed.

From this time to November 6 she suffered at times from headache and vomiting ; but the temperature continued normal, her colour and general appearance improved considerably, and indeed in most respects she seemed fairly well.

On the evening of the 7th she complained of pain all down the right leg, but chiefly in the calf. And the next day the limb was swollen from the knee downwards, and it was generally tender, but most so in the course of the short saphena vein, and the temperature throughout the day was about 100°. During the next few days the limb remained swollen, she had much tenderness along the front of the thigh and in the course of Hunter's canal, but there were no obviously enlarged or plugged veins, and her temperature continued febrile, through never rising above 101·2°.

Subsequently her improvement was fairly uniform. On November 17 the temperature rose to 100°, but always afterwards was normal or subnormal. It is true that she complained at times of more or less severe headache, and less frequently of pains in her eyes, and was occasionally sick ; that the right leg was apt to swell ; and that on one occasion she had a fit which appeared to be hysterical. But she now was able to get up regularly and to walk about a little ; no further complications arose, her optic neuritis improved (On December 16, the following note was made : 'The optic discs are clearing. In both there is haze, the vessels are obscured but not hidden, and the retina is distinctly streaky for a line all round the disc ; the arteries are small. In the left there is still some slight cedema'), and her ankle and knee clonus disappeared, the knee-jerks, however (and especially that on the right side), remaining brisk. It may be added that during her stay in the hospital the right pupil was usually a little larger than the other ; and that before she left it was noticed that she had slight enlargement of the thyroid body. She was discharged on January 10, 1887.

I will now recapitulate some of the more important points in the case, and comment upon them. The girl, who otherwise seems to have been healthy, had been getting bloodless for twelve months, when suddenly, and without warning, she was attacked on the day of admission with a series of fits, which appeared to be definitely epileptic, after which she continued for some days stupid, drowsy, and suffering from head-

ache, sickness, and feverishness. Her condition at this time was difficult to explain; but, as there was no evidence whatever of disease in the chest or abdomen, and, but for some anæsthesia of the right forearm and exaggeration of the tendon reflexes, no affection of motor or sensory nerves, I was inclined to regard the case as one of true epilepsy, and to think that the attacks of fainting to which she had latterly been liable might have been epileptic.

A fortnight after admission, when, excepting that she remained anæmic, she had almost completely recovered from the illness for which she had been under treatment, she was attacked with severe aching about the right ear (which proved not to be in the ear itself), and tenderness and swelling in the position of the upper part of right internal jugular vein. These phenomena, which were associated with fever and some impairment of hearing, lasted for several days and then subsided. While they were undergoing aggravation, I was led to suspect that they were due to thrombosis of the lateral sinus with extension into the internal jugular; a view which, though not confirmed by the presence of œdema about the mastoid, enlargement of superficial veins, or cerebral symptoms, was perhaps supported to some extent by the discovery of slight but obvious recent optic neuritis. A day or two after she had emerged from this attack, and at a time when she seemed better in health than she had been since admission, the left ear became affected just as the right had been. But the attack was much less severe, was unattended with fever, there was no impairment of hearing, and she recovered from it in the course of two or three days. It seemed so improbable that the patient should have had thrombosis, first of one lateral sinus and then of the other, in the course of about ten days, and with so little evidence of cerebral disturbance, that I felt compelled to give up my hypothesis, and to content myself with assuming vaguely that she had a cerebral tumour somewhere or other, or meningitis. Two days or so later, however, she was seized with undoubted phlebitis in the right lower extremity, indicated by pain and tenderness in the course of Hunter's canal, swelling of the leg below the knee, and febrile rise of temperature. The symptoms of this

affection lasted for a few days, and in their turn subsided. Subsequently, she still suffered occasionally from headache and sickness, and on one occasion had what was supposed to be a slight hysterical fit, but her optic neuritis became less marked, she lost her ankle-clonus, she regained colour to a considerable extent, and improved generally in health.

I need scarcely say, perhaps, that the occurrence of phlebitis in the leg induced me to reconsider my discarded hypothesis with respect to the earlier painful affections of the ears. And I really believe, looking to all the facts of the case, that she did actually suffer from phlebitis first of one lateral sinus and internal jugular, and then of the corresponding veins on the opposite side. I am free to admit that the symptoms were not conclusive as to the presence of phlebitis of the lateral sinuses, but they were highly suggestive; and were at any rate such as might attend that affection. I think that the probability of my view of the case being the correct one will be enhanced by the perusal of a fatal case of thrombosis of the lateral sinus which came under my care a few months later, and with which I shall presently conclude my paper.

What, over and above anæmia, was the patient's original malady, I do not pretend to decide. I venture to believe, however, that she had neither tumour, tubercle, nor meningitis. Possibly her group of epileptic fits was independent of any lesion, in the present state of our knowledge discoverable after death. Possibly, on the other hand, it may have been induced by some cerebral venous malady, of the same nature as that presumably occurring later. It may, however, reasonably be assumed (if my hypothesis be the true one) that the cerebral phlebitis was determined by long-continued anæmia, which is a well-known cause of thrombosis in the blood-vessels.

CASE 2.—Thrombosis of lateral sinus and internal jugular; headache, sickness, optic neuritis, and temporary hemiplegia; early pregnancy. Death from syncope (?).

Mary J., a servant aged 23, came under my care on June 6, 1887. She had had measles three years previously, since when (the mother said) she had not been so strong as before; and for some weeks after had complained of severe pain in her ears. It was added

by her master that her appetite had been falling off latterly. It was impossible to obtain any clear account of her illness from herself. But it seemed that, on May 25, she had experienced a sudden attack of pain in the right frontal region; and that she had suffered from headache and vomiting ever since. On May 30 she had taken to her bed.

State on Admission.—An anæmic but not emaciated girl, with sallow complexion, shrunken features, and an expression of extreme pain. She was sitting up in bed, complaining of pain in the head, and answering questions in a drowsy manner and after a considerable pause. This pain was said to be general; but she always pointed first to the left side. There was much tenderness over an area about $1\frac{1}{2}$ inches in diameter, immediately behind the left mastoid process, which was itself not tender. There was no swelling or œdema here; no thickening along the vessels; and no rigidity of neck. The ears were examined by Mr. Clutton, and found to present no trace of either past or present disease. There was no discharge, and neither perforation, thickening, nor undue vascularity of the tympanic membranes. She was not deaf. The movements of the eyes were good; but attention was difficult to gain. The left pupil was slightly larger than the right; but both pupils were active. There was commencing neuritis of both discs; distinct œdema with slight haze. No anæsthesia or paralysis anywhere. Tendon and superficial reflexes all normal.

The abdominal and thoracic viscera were apparently all healthy; and she presented no enlarged glands or tumour anywhere.

Lips dry, tongue moist, pulse soft, 60; respirations 16; temperature 99° ; urine (removed by catheter) 1080, without sugar or albumen.

During the next six days the patient seemed steadily to get worse. She continued drowsy and difficult to rouse, and complained at times of pain in the head and of pain and tenderness behind the left ear; her pulse varied from 60 to 80, her respirations from 16 to 25, and her temperature from 97 to 98.4° . On June 8, it was noticed, for the first time, that the right arm and hand were weak. And later in the day it was found, that the limb was completely paralysed, and the right leg and foot were manifestly weak, but there was no facial paralysis, and no anæsthesia; that she took no notice of a light brought close to her eyes, but that she moved her head when a smoking match was placed under her nose; and that she would not or could not answer. The optic neuritis was much more intense than on admission, there being œdema and haze, and a few pale hæmorrhages. During the last three days of this period she passed her water into the bed. She had no sickness, and took her

food fairly well; and the superficial and tendon reflexes remained normal.

On the 13th, though no better as regards her paralysis, she was decidedly more sensible than she had been, recognised faces, which she does not seem to have been able to do before, showed signs of emotion, had little headache, asked for tea and bread-and-butter, and passed her evacuations consciously.

On the 14th she was quite sensible (she had been a little strange the night before, and had tried to get out of bed), and answered questions readily, though acting generally like one who is very sleepy and wants to be let alone. She had almost completely recovered the use of her right arm, and could move it at all its joints, and her fingers as well; also the movements of her right leg were now quite free. Her headache was slight, and the pain and tenderness on the left side had much diminished. Took food well, pulse 52, temperature 98.2°.

This improvement continued until the morning of the 19th. She became bright and sensible, answered questions readily, and even laughed occasionally; her arm and leg became stronger and more within her control from day to day, until they were as strong as their fellows; she retained power over her evacuations and a good appetite; but she still complained more or less of headache, and her retinae remained in the same state as on the 8th.

June 19.—At 4.30 this morning, while sleeping quietly, she suddenly sat up in bed, and turned round to the left, her eyes also being directed to the left; then lay down on her left side, 'straightened herself out,' and vomited. Then she turned on to her back with her knees drawn up, breathing deeply and noisily (52 in the minute, and occasionally giving a deep sigh), her pulse being 80 and very feeble, and her face ashy-white. No paralysis was evident; she was able to swallow whatever was put into her mouth with a spoon, and was probably conscious, for she followed her attendant's movements with her eyes; but she did not attempt to speak. At 5 A.M. her pulse was 90, very feeble and fluttering; and her face was deadly pale, not blue. She died at 6, appearing to be conscious almost to the last.

Autopsy.—Skull-cap natural. On opening the longitudinal sinus, a moderate quantity of dark fluid blood escaped. On reflecting the dura mater from the vertex, all the larger veins on the surface of the brain appeared distended, and when opened were found to be plugged by adherent and partially decolorised clot. The obstruction in each case extended on the one side up to the entrance of the veins into the longitudinal sinus; on the other to the

lateral aspect of the hemisphere. The veins on the under surface of the brain were all healthy. The cerebral arteries also were healthy and unobstructed. There was no lymph on any part of the surface of the brain, and no stickiness.

The brain-substance was generally of normal consistence and appearance, and not unduly vascular. Two small hæmorrhages, each about the size of a pea, were found in corresponding situations on opposite sides of the brain, namely, the white matter just in front of the upper end of the parieto-occipital fissure. There was no excess of fluid either on the surface or in the ventricles, nor any tumour.

The venæ Galeni contained clot similar to that found in the other veins.

On examining the remaining sinuses, it was found that the whole of the left lateral sinus, the straight sinus, and the torcular Hærophylæ were full of adherent and partly decolorised clot; that a little pale clot adhered here and there to the lining membrane of the right lateral sinus, which otherwise contained dark fluid blood, but that all the other sinuses were unaffected. The walls of the obstructed sinuses and veins appeared to be healthy. The base of the skull was in all respects natural; and no trace of disease was discovered in any part of the left ear.

Examination of the neck showed that the left internal jugular vein, as low down as the angle of the jaw, was obstructed by clot, similar to that seen in the left lateral sinus and continuous with it. The internal jugular on the right side was normal; as also (it may be added) were the iliacs and femorals.

There were no traces of disease elsewhere in the body. But the uterus contained a fœtus of about six weeks, and the right ovary a true corpus luteum.

That the symptoms and progress of the second case were not identical with those of the former case is obvious; but the symptoms of thrombosis of the cerebral venous sinuses are apt to differ considerably in different cases, and are often vague and inconclusive. Yet there was sufficient resemblance between them to suggest, while the second patient was under treatment, that she might be suffering from thrombosis of the left lateral sinus. Her illness was of twenty-five days' total duration; she suffered from headache and sickness, and especially from pain and tenderness in a small area just behind the mastoid process; she had no inflammation of the ear itself

and no loss of hearing; she presented optic neuritis, and was free from febrile disturbance. So far the symptoms in both cases were nearly the same. On the other hand, in the first case there was in one of the attacks slight deafness, febrile temperature, and pain and tenderness in the course of the internal jugular—symptoms of high significance, which were absent from the case of undoubted thrombosis even though the jugular vein was implicated; and in the second case there was temporary right hemiplegia, and drowsiness. It is interesting that this patient recovered completely from her paralysis, and improved so much in every respect, during the last few days of life, that her restoration to health was not unreasonably hoped for. Her death, which was unexpected, appeared to be due rather to sudden collapse than to any definite cerebral cause.

It is noteworthy that in this case, as in the former, there was marked anæmia; and nothing else in the history or condition of the patient (excepting possibly mental distress, arising from her illegitimate pregnancy) to suggest an explanation of venous thrombosis.

XIII.

STUDIES OF A CASE OF CEREBRAL DISEASE.

2. HYSTERICAL ANÆSTHESIA, &c.

MARGARET MCH. was again admitted under my care on October 22, 1887. She had remained fairly well, although the catamenia had been absent, up to three months previously. Since that time her courses had returned scantily, but she had been liable to attacks of illness coming on about every three weeks, and lasting for six or seven days. During the first two or three days of each such attack she complained of gradually increasing headache, followed at the end of that time by delirium and partial coma, lasting for seven or eight hours, and then by profound sleep of fifteen or sixteen hours' duration. On waking she was much better, but did not regain her ordinary state of health until after the lapse of two or three days.

Two days before admission she took to her bed, suffering from severe headache; and during these two days she was frequently sick.

On the morning of the day of admission she got up for a time, but was obliged to go back to bed, feeling faint. About 3 P.M. she was sick, and seems to have become unconscious. Admitted at 7 P.M., and said to have been unconscious then.

When seen at 8.30 P.M. she was lying on her side, with hands clasped on the top of her head; able to answer all questions fairly well; but dull and sleepy in manner. She complained of intense pain, chiefly at the vertex, but extending down to the ears on both sides. There was a certain amount of tenderness over the whole of the upper part of the scalp, which was most marked just above and behind the ears, especially the right. There was no tenderness over the tips of the mastoid processes, or in the neck below them; nor was there any swelling anywhere in these regions.

She was extremely anæmic, but well-nourished: and her hands and feet were very cold. Temperature, 99.4°; pulse, 92; tongue straight and clean; urine, sp. gr. 1012; no albumen.

There was no sign of disease in the chest or abdomen, excepting considerable tenderness on pressure over the lower part of the abdomen, especially on the left side.

No trace of muscular weakness was discovered in eyes, face, trunk, or limbs.

As regards sensation, the condition was doubtful, owing to her mental state. There was possibly blunting of perception over backs of hands and shins; but for the same area of skin her statements varied every few seconds. Knee-jerks very brisk. Ankle-clonus not obtained on either side, but there was distinct patellar clonus in left leg. No tenderness or swelling in legs: no œdema anywhere.

Pupils small, equal, active. During the next few days, with the exception that she suffered from headache, she remained fairly well.

On the morning of the 27th she was lying curled up, with her face hidden. She would not reply to questions; but when pressed twisted herself about, the character of her movements suggesting that she had pain on the right side of the neck. Pulse 80; temperature 97°.

October 28th.—‘Brighter again to-day. Yesterday she did not know where she was, and now says that she has no recollection of the events of yesterday. To-day pain is still severe, as if the ‘skull was being stretched.’ Pain and tenderness most marked on right side of the neck, behind jaw, and down sterno-mastoid and neck-muscles for some three or four inches. But some pain on pressure is due, at any rate, to cutaneous hyperæsthesia.

‘Areas of complete anæsthesia and of impaired sensation are scattered over the body in an irregular and unaccountable manner, especially along right shin and dorsum of foot, right wrist, forearm and back of hand, right cheek, left shoulder and front of chest. Blood may be drawn without pain at a spot half an inch from which there is perfect sensation.

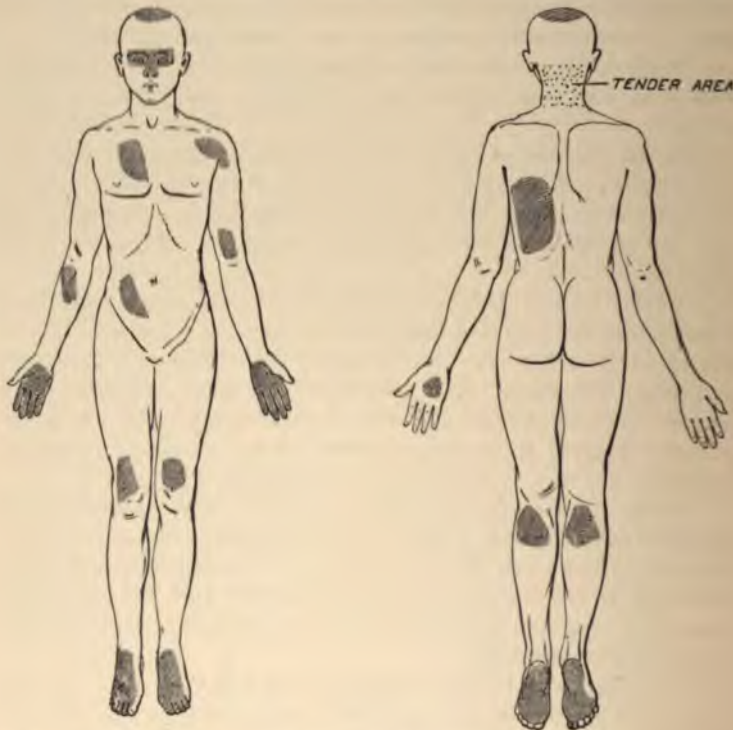
November 1st.—‘Mental condition was dull yesterday: she lay still, declining to make sufficient effort to answer questions. To-day brighter, sitting up in bed mending stockings. Pain continues, most severe across top of head, and there is slight general tenderness of scalp; the tenderness is, however, most marked all round the back of the neck from ear to ear.

‘Anæsthesia is more marked than before: the shaded areas in the diagrams represent the spots where she can feel the prick of a needle, but even for these spots her answers vary; over the unshaded parts of the body sensation is much impaired or entirely absent.

‘No disturbance of colour-vision; smell perfect; hearing good

and equal; condition of taste doubtful: she does not recognise mustard, salt, or sugar rubbed into either side of the tongue, until the organ is drawn back into the mouth.

'She states that she sees double on looking to the extreme left (this she has complained of before); but there is no perceptible weakness of any eye-muscle. Pupils of medium size, equal and active. No obvious weakness or paralysis anywhere; knee-jerks decidedly brisk, but no ankle or patellar clonus; no plantar reflex.



Left ovarian tenderness well-marked. There is a tendency to retention of urine. Bowels confined.'

In the course of the next few days Mr. Nettleship examined the patient's eyes, and reported as follows: 'Left, shows remains of haze, slight oedema, and parallaxic movement of vessels; Right, difficult to say anything had been the matter;' and the fields of vision were determined, with the results that both were much contracted, and that, while in the left eye the field for blue was still larger than

that for red, in the right the field for blue was considerably more restricted than that for red.

It was also observed, that the soles of the feet had become anæsthetic; and that, although the plantar reflexes were absent, the abdominal reflexes were brisk.

November 19th.—Was depressed and emotional yesterday, and complaining much of headache. She is better in these respects to-day; but the palms of the hands, as well as the soles of the feet, are now anæsthetic, with the exception of the thenar eminences, on both sides. The general anæsthesia remains as before. The tongue is completely insensitive to tactile and thermal impressions, but taste still remains. Knee-jerks normal; no cloni; plantar reflexes absent, patellar normal.

On November 21st and 22nd, the muscular power in her upper extremities was tested. In the first place, her eyes being closed, she was told to flex her arm as powerfully as possible; at the same time the actual movement of the arm was restrained by force. On opening her eyes she was surprised to find that the position of her arm had remained unchanged, saying that she thought she had brought it close to her face. In the second place she was made to support various weights, hung from her wrist in a handkerchief in which they were concealed. She could not detect any difference between half a pound and a pound, and only when the weight was trebled did she recognise that one was heavier than the other. Control experiments were at the same time made on a normal subject.

By this time the patient's health generally had undergone great improvement: she had lost her anæmia and acquired a healthy colour; her fits of delirium, or partial unconsciousness, had ceased for some weeks; her headaches, though they had not wholly left her, had diminished much in frequency and severity; she was bright and cheerful, and seemed, on the whole, in very good health. But there was no improvement in respect of anæsthesia.

She continued in the same state, and on November 27th was discharged, still anæsthetic, but otherwise well.

On admission a blister was applied behind each ear, and an ice-bag to the head. She was treated throughout her stay in the hospital with 20 grains of bromide of potassium three times a day; to which (at the end of the first week) were added 15 grains of the saccharine carbonate of iron twice daily.

No matter what the nature of this patient's illness may have been when she was originally under my care, there can

XIV.

ON DEATH FROM CEREBRAL HÆMORRHAGE
IN PURPURA.¹

It is not often that purpura proves fatal by hæmorrhage into the substance of the brain; and my present object is to call attention to two such cases which have happened within my own experience. Before narrating them, however, I propose making a few observations with regard to this disease.

Disseminated extravasations beneath the skin, in the solid organs and tissues, and at the serous and mucous surface¹, attended, maybe, with more or less abundant loss of blood, are not infrequent, in many different maladies in which either there is profound constitutional disorder, or some serious hindrance exists to the passage of blood along the veins. Among such maladies may be enumerated certain of the specific fevers (as small-pox and typhus), rheumatism, scurvy, leucocythæmia, so-called 'pernicious anæmia,' obstructive diseases of the heart, and affections of the liver. But in all these cases, even though occasionally in some of them the hæmorrhagic phenomena may exactly resemble those of purpura, the fact that the hæmorrhage constitutes only a subordinate symptom of some well-recognised grave disorder separates them absolutely from the disease to which the name of purpura by general consent is given.

True purpura is a so-called 'idiopathic' disease, the cause of which is as obscure as are the causes of leucocythæmia and 'pernicious anæmia.' It attacks persons of all ages, from early childhood to the decline of life, males and females in equal proportion, those who are apparently in good health

¹ *Med. Times and Gazette*, July 1883.

as well as such as are already ailing; and, so far as I know, its appearance is independent of local sanitary conditions and dietetic errors. It has, moreover, a tendency to recur, and I have notes of several cases in which children have been brought to me at intervals of some months, suffering from two or even three recurrences.

Purpura is commonly divided into two varieties, namely, purpura simplex, and purpura hæmorrhagica: the former being characterised by the appearance, in successive crops, of numerous petechial spots in the skin and visible mucous surfaces, and attended with little or no manifest constitutional disturbance; the latter being characterised by the occurrence not only of petechiæ in these situations, but by more abundant extravasations of blood into the connective tissue and substance of solid organs, by more or less copious hæmorrhage from the mucous membranes, and, further by progressive anæmia and debility. It must be admitted that typical cases of simple purpura, which are common, are for the most part unattended with danger, and run a favourable course; and that typical cases of the hæmorrhagic form, which are comparatively rare, are attended with grave symptoms and are apt to prove fatal; and that there is some clinical justification, therefore, for placing them in separate groups. But it should never be forgotten that the distinction is a purely artificial one; that true purpura in all its forms is (so far as we know) the same disease; that the simple and hæmorrhagic varieties are linked together by the frequent occurrence of cases of intermediate severity; and that, although the prognosis of a case of purpura simplex is generally favourable, there is always the possibility that it may assume grave proportions, that it may be attended with anæmia and debility, and prove fatal by hæmorrhage. An attack of purpura, therefore, however mild it may seem to be, can never be regarded as wholly free from risk.

Apart from the hæmorrhages beneath the skin and visible mucous membranes, and the more or less abundant bleedings that take place from time to time from the nose, mouth, lungs, stomach, bowels, or genito-urinary organs, the symptoms of purpura hæmorrhagica are not specific, and to a large

extent are referrible to the losses of blood which the patient experiences. They are, mainly, progressive debility and anæmia, associated with irritability of temper, headache, pains in the limbs, shortness of breath, feebleness of the heart's action, loss of appetite, and occasional slight febrile temperature; notwithstanding which, however, patients will often continue to perform their ordinary duties throughout the greater part or even the whole course of their illness. The duration of purpura hæmorrhagica is generally some weeks, and its event is for the most part favourable; but death, which is generally due directly to hæmorrhage, or to the debility which repeated hæmorrhages induce, may occur at any time in the course of the disease.

Of the pathology of purpura, as little, I believe, is known as of its causation. Neither the blood nor the blood-vessels give distinct evidences of either chemical or structural change; yet it is impossible that numerous and abundant hæmorrhages should take place unless there be something abnormal in one or other or both of these constituents of the organism. That the extravasations depend on laceration of vessels there can be no reasonable doubt; and, indeed, the situation and character of the hæmorrhages into the brain seem to accord exactly with those of cerebral hæmorrhage in ordinary apoplexy or from injury. Such laceration must depend either on weakening of the parietes of the vessels, making them apt to rupture, or on undue pressure from within. There is no obstruction, however, in the right side of the heart, and no increased arterial tension, to justify the latter explanation. The former, therefore, is probably the correct one; and it may be surmised that the enfeeblement, laceration, and resulting hæmorrhages are the consequences of the ordinary causes of these conditions, namely, obstruction of the smaller arteries of the districts in which bleeding occurs. Thrombosis or embolism might explain this obstruction; but as there is no obvious source of embolism, it seems probable that the proximate cause of obstruction is thrombosis due to some morbid condition of the blood which renders it liable to coagulate.

The treatment of purpura is as unsatisfactory as are its

causation and pathology. Antiscorbutic remedies have been largely employed in consequence of a belief that prevails (but seems unfounded) that the disease has a close causal relation to scurvy. Other remedies are tonics and astringents; and, though I acknowledge some scepticism as to their special efficacy, it is in such medicines that, in the present state of our knowledge, we are compelled to trust mainly. Good and wholesome diet and healthy surroundings are, of course, important aids.

The two cases which I subjoin are typical examples of purpura hæmorrhagica, with the additional important feature to which I have adverted, namely, that death was due to hæmorrhage into the substance of the cerebrum. In the latter of the two cases the hæmorrhage was sudden, and caused death in the course of a few hours; in the former the symptoms were comparatively slowly developed, and the bleeding therefore was probably gradual. The symptoms of the cerebral lesion were well-marked. It is noteworthy that in one of the cases the patient became blind of one eye from extravasation into it a few days before death. I may here mention that Sir Thomas Watson, in his Lectures, records a case of purpura in which also death was due to cerebral hæmorrhage.

CASE 1.—Purpura; effusion of blood into the brain. Death.

J. S., a fitter, thirty-three years of age, admitted under my care on November 9, 1878. He had an attack of acute rheumatism nine years previously, and a second attack five years later; since which he has suffered from short breath.

About four months previous to admission he began to ail, and he has been out of health ever since; but he did his work as usual up to the morning of the day on which he came to the hospital. He suffered during the whole of this period from weakness, rheumatic pains in the limbs, and shooting pains in the head, dimness of sight and giddiness, morning sickness, and irritability of temper. Also he had frequent attacks of epistaxis; on one occasion he vomited a large quantity of blood; and dark purplish spots came out from time to time in more or less abundance. He had a fit of shivering the night before admission; and the next morning, after breakfast, while standing at work, he was suddenly attacked with

giddiness, loss of sight, and faintness, and had to sit down. Not recovering, he was brought to the hospital.

When first seen he was pale and faint, with surface cold and teeth chattering, unable to stand, and complaining of giddiness and pain in the head; pulse small and weak. Half an hour later he vomited, and became partially unconscious, but when roused he answered sensibly, the pain in his head also was more severe, and from time to time he struggled and threw his arms about. Pupils equal, acting readily to light; no paralysis. Limbs and trunk covered with purpuric spots of different ages, and varying from the size of a pin's head to that of a threepenny-piece. Tongue moist, and thinly coated with a white fur. Teeth black and decayed; gums bleeding slightly. Temperature 99°. The heart was somewhat enlarged, with a feeble impulse; its action was irregular, and a faint systolic murmur was audible at the apex. Pulse 72. No discoverable affection of the lungs or abdominal viscera. Bowels have been regular. Urine, specific gravity 1015; no albumen.

At 9 P.M. he was still in a semi-comatose condition, and breathing noisily; but he could be roused, when he answered questions irritably. He tossed about in bed, and occasionally cried out as if in pain. There was distinct loss of power in left arm and leg, lower part of left side of face, and left side of tongue. Pulse 66, full, irregular. Temperature 100°. Head to be shaved, and an ice-bag to be applied. A black draught to be given at once.

November 10.—He remained in the same condition all through the night. One loose motion. Tongue dry and brown. Pulse 84, full and strong; temperature 98.2°. Several large bruise-like patches have appeared on arms and legs. At 2 P.M. I made the following note:—'Is drowsy, but can be roused. Complains of pain across forehead and eyes. Rambles; wants to know if I am going to the night-school; and also says that he is in a consumption, adding, "The kippers are—the fishes are." Left arm and leg paralysed and limp. No reflex movements obtainable in left leg, but right leg drawn up when left foot is tickled. Eyes closed; pupils small, equal; no squint. Tongue coated. Respirations tranquil.' Temperature 98°. At 9 P.M. he was very noisy, throwing the bedclothes off, and trying to get out of bed. He still complained of his head. Pupils contracted; right rather smaller than left. Pulse 60, full; temperature 98°. A third of a grain of hydrochlorate of morphia was administered subcutaneously.

11th.—After the injection he sank into a deep sleep, which gradually passed into coma. This morning he is quite unconscious

and still. Pupils small; conjunctivæ insensible. Breathing stertorous. Pulse 132. At 8.15 he was quite insensible, lying on left side. Face flushed; skin moist; pupils (especially right) much dilated; subsultus tendinum. Respirations, 60; pulse, 152. 9 P.M.: lying on back, wholly unconscious; perspiring. Respirations 60, very noisy; pulse 164. Twitchings of left arm and leg. He passed water into the bed.

He died a little after one on the morning of the 12th. The temperature rose gradually in the course of the last sixteen hours of his life. It was 100° at 8.40 A.M., 102.1° at 1 P.M., 103.4° at 4 P.M., 103.6° at 6 P.M., and also 103.6° about half an hour after death.

Autopsy.—On opening the skull, the dura mater appeared somewhat congested, and many patches of extravasated blood were found on the surface of the pia mater, especially on the left side. On examining the brain, the greater part of the right occipital and temporo-sphenoidal lobes was found to be broken down into a large irregular cavity, filled with coagulated blood and brain-debris. This cavity communicated with the posterior cornu of the lateral ventricle, which also contained dark coagula. Numerous punctiform hæmorrhages were found studding the surface of the left optic thalamus and the surface of the posterior cornu. The brain was otherwise normal. There was no atheroma or plugging of the arteries. Lungs congested and œdematous. Heart enlarged, especially left ventricle; decolourised clots on right side; aortic valve competent, but presenting a few small vegetations on ventricular aspect; mitral valve healthy; small ecchymoses on auricular surface. Liver enlarged, congested, somewhat fatty. Numerous punctiform extravasations on surface of kidneys, which were otherwise healthy. Patches of ecchymosis also in walls of small intestine.

CASE 2.—*Purpura; effusion of blood into the brain. Death.*

M. J. B., a single woman, a cook, aged fifty-seven, was admitted under my care on November 27, 1882.

About thirty years ago she had an attack of hæmatemesis, and ten years later experienced a slight recurrence. The catamenia have always been scanty and irregular.

Her present illness began on the 14th, when she brought up a large quantity of black clotted blood. She has continued to vomit blood from time to time ever since. Before long she observed that she was passing blood with her water, and that she had pain in micturition. She had also had considerable menorrhagia during

the same period, and large bruise-like patches have appeared over her trunk and extremities.

The patient was brought to the hospital in the evening from Enfield, and on admission was much exhausted. She was a pallid, anxious-looking woman, and complained of pain and tenderness in the abdomen and throat. Tongue clean, but fissured; gums not spongy. Bowels regular; pulse 108, small and weak. Subcutaneous extravasations of blood, of largish size, irregular form, and varying in colour from dark-red to yellowish or greenish stains, were observed in the arms and legs; few or none were present in the trunk, and there were no extravasations about the mucous membrane of the mouth. The heart and lungs presented nothing abnormal; and, beyond the presence of pain and tenderness, the abdomen also and its contents seemed free from disease. The urine contained blood, but it was not clearly ascertained if the blood came from the bladder or vagina. Temperature 100·2°.

The next day, the 28th, there was no particular change. Indeed, though weak, she seemed to be going on well. In the morning her temperature was 99·6°, in the evening it was 101·8°.

Between 3 and 4 A.M. on the 29th she started up in bed and cried out. When the nurse went to her she was sensible but speechless, and waving her right arm round and round. She made noises in the throat as though she were trying to speak. She soon became comatose, and died in this condition at 9 A.M.

It was subsequently ascertained that she had suddenly lost the sight of the left eye a few days before admission. She did not, however, draw attention to the state of her eye while in the hospital.

The *autopsy* was made next day. Rigor mortis well-marked; bruise-like markings on trunk and limbs well shown. Chest: heart and pericardium healthy, except that there were numerous petechial spots beneath the visceral pericardium. The lungs were œdematous, but there were no extravasations of blood either in them or in the pleuræ. Abdomen: peritoneum healthy. Liver healthy and pale. Spleen large, with thickened adherent capsule. A few small hæmorrhages into and beneath mucous membrane of stomach. Intestines healthy. The kidneys (especially the right) were freely movable beneath the parietal peritoneum; their substance was healthy; in the pelves and calyces of both organs the mucous membrane was abundantly infiltrated with blood. In the bladder also (which was otherwise healthy) there were two large patches in which blood had been extravasated into the substance of the mucous membrane, and there were numerous petechial spots. Uterus and ovaries healthy. Head:

Over left hemisphere of brain, in front of the fissure of Rolando, there was considerable presence of blood in the subarachnoid tissue. On dissecting the brain a large quantity of dark, imperfectly clotted blood was found extravasated into the left centrum ovale. This reached to the convex surface of the brain above, and opened into the lateral ventricle below. On the confines of the main extravasation numerous small hæmorrhages were visible, seeming to show that the blood had escaped from a number of small vessels rather than from one of large size. There was also a large effusion of blood into the left retina.

XV.

ON BILATERAL FACIAL PALSY.¹

BETWEEN three and four years ago I was consulted in a case of injury to the head, attended, or rather perhaps followed, by symptoms which interested me a good deal at that time.

A young man, twenty-one years of age, was alighting one evening (five months previous to the date of my interview with him) from a train which had overshot the Deptford station on the London and Greenwich line, when, mistaking in the dark the low wall which flanks the railway for the platform, he stepped on to it, and the next moment was precipitated head-over-heels into the road beneath. The main facts which I learnt concerning his subsequent history were as follows : that he was carried insensible to the ' Dreadnought ' Hospital, where no local signs of injury to the head were detected beyond the fact that blood was oozing from the ears and nose, and where also some of the ribs on the left side were ascertained to be broken ; that he remained absolutely unconscious for about four-and-twenty hours, and partly unconscious for two days more ; that during this time it was observed that he was paralysed on the left side of the body and on both sides of the face, that he squinted and was deaf, and that owing to a wound of the lung pneumothorax was developed on the corresponding side ; that after his recovery of consciousness he remained feeble in mind, with impaired memory and tendency to delirium and emotional disturbance ; but that (with the exception that the squint disappeared from the eye first affected and then attacked the other) gradual improvement had taken place, chiefly in his general health and the con-

¹ *Lancet*, January 1883.

dition of his chest, but to some extent also as regards his cerebral symptoms.

He was a spare but well-nourished man, with a curiously vacant expression of countenance. He had almost complete paralysis of both seventh nerves. His face was smooth and void of wrinkles. He could not close his eyes, or whistle or blow out a candle, or retain fluids in the anterior part of the mouth, or bring his lips into actual contact. Neither could he pronounce the labial letters *b*, *p*, *m*, *v*, *f*, or *w*; but he could pronounce all others, and in conversation invariably replaced the labials by their corresponding linguals—*b* by *d*, *p* by *t*, *m* by *n*, and *v* and *f* by *th*. His hearing was impaired on both sides, more especially on the right; but he could hear. The external rectus of the left eye was paralysed, so that he presented an internal squint. The left upper extremity was partially paralysed, a little contracted, and slightly but generally wasted. Moreover, there was slight impairment of sensation, especially in the little and ring fingers. The left leg also appeared a little wasted, but he seemed to use it as well as the other. He was, so far as I could judge, quite sensible; but it was said that his memory was still defective, that he was incapable of application, and that now and then he would give way to anger, which formerly he never did. No other abnormal phenomena referrible to the nervous system were observable. His sight was good, he could distinguish colours, his pupils were equal and acted naturally, and there was no paralytic condition of any of the cerebral nerves but those which have been specified. There was impaired mobility of the left side of the chest, with some contraction of it, displacement of the heart to the left, and dulness at the base. No signs, however, of progressive disease were detected.

There was no evidence as to what part of the head was struck in this case, or, indeed, that the head itself received any direct injury. But it was quite clear that damage had been inflicted on the soft parts within the skull. There was doubtless some bruising of the brain; but where exactly it was, under the circumstances, it is idle to speculate. So much however, was clear—namely, that some bruising or laceration had occurred in the neighbourhood of the pons Varolii, and

that there had been more or less implication of both acoustic and both facial nerves and of the sixth nerve on the left side. And the opinion I formed was to the effect that he had had a fracture of the base of the skull ; that the several nerves above named had been damaged, either by being themselves bruised or by being pressed upon by blood extravasated beneath the dura mater ; and that the hemiplegia might have resulted from damage to the motor tract in the immediate vicinity. The probability that he had fracture of the base was enhanced by the bleeding that took place from both ears at the time of the accident. I may here state that I have recently learnt from Dr. Kavanagh, under whose care the patient was, and who still sees him from time to time, that he has so far recovered as to be able to earn a livelihood, but that his paralytic symptoms and his peculiarities of speech remain much as they were.

I was chiefly interested in this case because of the existence of double facial paralysis—a condition which is very rare, and which I have seldom seen—and of the association with it of a phenomenon which, on theoretical grounds, might be expected to be present in such cases, but which I had never hitherto observed—namely, absolute inability to utter any labial letter. I need scarcely say that in paralysis of the portio dura of one side defective articulation is not generally noticeable, and that the patient can pronounce the labials without difficulty. My interest in the case was revived about a year ago by the fact of another patient coming under my care who (also as the consequence of injury to the head) suffered from double facial paralysis, but who presented additional symptoms of a remarkable character ; and in whom the opportunity was afforded of investigating *post mortem* the causes of the phenomena observed during life. The following are the particulars of the case :—

A man, formerly a soldier, forty years of age, came under my care on Sept. 21st, 1881. Exactly two months previously he had fallen down some area steps, and struck the back of his head, and had been carried insensible to one of the London hospitals. A deep cut was found in the occipital region, but no sign of fracture was detected, and he remained

more or less insensible for a fortnight. At the end of a month he left the hospital presumably well. But I have since learnt that indications of paralysis of the facial nerves had been observed. During the ensuing month he remained at home, and it was noticed that he was much more irritable and fidgety than he had previously been, that he was inclined to be drowsy, and that his speech was thick and indistinct. Moreover, his appetite failed, he had a constant and painful desire to go to stool, the bowels being relieved with difficulty, two or three times a day, of a few small hard scybala, and he lost flesh and strength. There was no impairment of memory, however, no vomiting, no loss of control over his bladder. On admission into St. Thomas's Hospital it was noted that he was a short, feeble, emaciated man, very bald, with sunken eyes, and an immobile, melancholy-looking face. There was a recent scar about two inches long in the occipital region. On closer investigation it was discovered that he had imperfect paralysis of both facial nerves: his forehead was smooth, he could not close his eyes, the naso-labial furrows were ill-defined, and if he attempted to laugh only a very slight movement was discoverable in the lower part of the cheeks and about the mouth. He could, however, close his lips, and had no difficulty in keeping fluids in his mouth. His want of variability of expression was clearly due to the paresis of his facial muscles, and the prevalent melancholy look was dependent partly on the same cause, but partly on the subsidence of the eyes into their sockets. There was no other obvious nervous default in connexion with the head and neck. The muscles of the eyeballs acted properly, the pupils were equal, and acted to light and accommodation, his sight was good, and the fundi of the eyes showed no pathological change. There was a little deafness on both sides, but this was said to be of old date. His tongue was protruded straight and without difficulty; there was no defect of mastication or deglutition, and phonation remained unaffected. His speech, however, was, as it had been said to be, thick and indistinct. He could enunciate all the individual labial sounds, and even the linguals, but when uttering them in combination they were imperfectly articulated and slurred. His speech, in fact, was

exactly such as is observed in cases of early glosso-labio-laryngeal palsy. It is right to say, however, that he always asserted that his speech was naturally indistinct, and that he did not admit it had deteriorated lately. The arms, especially the forearms, were much shrunk; the legs also were extremely thin. There was no wasting or paralysis of particular muscles or groups of muscles; there were no tremors; but there was extreme general muscular debility. Sensation was unimpaired; the superficial reflexes were little marked; the tendon reflexes were present, but perhaps unduly sluggish. He appeared to be low-spirited and apathetic, and complained of pain at the back of the head, and in the umbilical and epigastric regions. The chest expanded imperfectly, but all the thoracic viscera appeared to be healthy. The respirations were normal as to frequency, and the pulse feeble, but otherwise natural. The abdomen was shrunk and its walls flaccid: no tenderness or tumour could be detected. Tongue thickly coated, appetite bad, no sickness; he complained of persistent uneasiness about the rectum, and a constant desire to defecate, but there was no evidence of piles or other disease in the rectum or anus; there were not, and there had never been any discharge of pus or mucus, and the motions, which were passed with extreme difficulty and much straining, were voided only occasionally and in small quantities; they were healthy in character. The urine was normal in amount, slightly alkaline, and containing amorphous phosphates, but no albumen or sugar; its specific gravity was 1025. His temperature was normal; his weight 8 st. $\frac{1}{2}$ lb.

There was no very great change in the patient's symptoms during the remainder of his illness, excepting that he gradually became thinner and weaker, and more apathetic. He was always quiet, reserved, and disinclined to speak; for the most part indifferent as to what was going on around him, yet sometimes becoming irritable and worried about trivial things. His appetite was bad, but he complained neither of sickness nor of thirst; and his bowels continued almost to the end to be a source of great discomfort and misery to him. There was never discovered any sign of local mischief, and the motions were always normal in character, or perhaps a little hard;

but he suffered from almost constant tenesmus, which was only momentarily relieved by the occasional passage of small lumps of fæcal matter. It may be added that there was no discernible undue accumulation of fæces in the rectum, and that on the average a sufficient amount was passed daily. At times, and more especially latterly, this symptom was kept in abeyance by the use of morphia suppositories. His paralytic symptoms remained without change. His temperature was generally about the normal, occasionally rising a little above, but more commonly falling a little below. He had at all times a great inclination to remain in bed; and for the last three or four weeks of his life remained in bed almost constantly, lying huddled up on his side, with his head buried beneath the bedclothes, and though quite sensible, or at any rate understanding all that was said to him, seldom vouchsafing any answer to those who questioned him. He seemed also to be getting more and more imbecile. About a week before his death his weight was ascertained to be only 6 st. 4½ lbs., so that he had lost nearly two stones from the time he was received into the hospital. During the last week of his life he vomited occasionally.

About noon on Dec. 23rd, two months after admission, he was discovered insensible, with head thrown back, and mouth open, sweating profusely, breathing at the rate of four respirations in the minute; his pulse very feeble, irregular, and about 90; his pupils contracted and equal; and his temperature 96·7°. He continued in this state (his temperature, however, falling to 95°) until his death, which took place shortly before five the same evening.

The points of particular interest in this case were: the presence of double facial palsy; the curious combination of irritability, apathy, and drowsiness, and apparently progressive enfeeblement of mind; the rapid general wasting of the tissues, and more especially of the muscles, without paralysis; and the constant and painful desire to defecate, apart from the presence of any local conditions to explain it. To what were these symptoms attributable? That there was damage to the soft parts within the skull was certain; and that there was fracture of the base of the skull was probable, at least I

thought so. It is true that no fracture was detected at the time of the accident, that there had been no bleeding or discharge of watery fluid from the ears, and that a blow on the back of the head is less likely to be attended with fracture at the base than blows in several other situations. But, on the other hand, a blow here not infrequently causes a linear fracture of the occipital bone, which fails to be recognised during life; and such a fracture might easily run down to the suture between the occipital and temporal bones, and might lead to the separation of the edges of these bones, and then become connected with a fissure running across the base of the skull. Besides which we had in this case just that kind of paralysis which might be expected to result from a basal fracture, which seemed best explained by such an accident, and which in the case first narrated was almost certainly due to that cause.

One can never predict with certainty either the amount or the situation of the injuries which after death will be found to have been inflicted on the brain even by accidents in which the bones of the skull are broken. Not unfrequently there is injury of the part corresponding to the blow; sometimes there is laceration either in the substance of the brain or of some of the delicate laminæ or processes which extend between adjoining parts; almost always there is more or less serious bruising by contrecoup of those regions of the surface of the brain which abut on bone opposite to the seat of injury. On the whole, however, considering that the patient had not fallen very far, and that there was no depression of skull at the point which had been struck, I was inclined to think the chief if not the sole, injury to the brain was from contrecoup. I shall best explain my views, perhaps, by narrating a case that occurred to me some years ago.

A man, walking over London-bridge, was seen by a policeman to stagger, and fall violently on the back of his head. He had probably slipped on a piece of orange-peel. He was picked up insensible, and brought to St. Thomas's Hospital, where in a very short time he died. There was some bruising and laceration of the integument over the occiput; but no fracture was discovered. At the post-mortem examination, however, a linear fracture of the occipital bone was found,

extending from an inch above the tuberosity into the foramen magnum, and situated to the left of the median line. There was much effusion of blood into the cavity of the arachnoid and into the subarachnoid tissue; and there was considerable bruising, with laceration, of the anterior portions of each cerebral hemisphere, and of those portions of the middle cerebral lobes which were in relation with the greater sphenoidal wings. There was no other injury.

Now in this case there was just such a fracture as I supposed might have occurred in the case under consideration, but its direction was somewhat different; and the mischief within the skull, excepting that there was no damage to the facial nerves, was precisely that which usually results from contrecoup, and which I expected to find on the present occasion. I hoped, however, to find something more.

A careful autopsy was made, at which I was present. The scar on the occiput was very distinct; but there was no further affection of the soft parts outside the skull. There was no trace of injury to the skull itself; clearly there had been no fracture of the base. The front and under part of each anterior cerebral hemisphere were softened and of a yellow-ochre tint. The same conditions were observed in the anterior and under part of each middle lobe; and a few yellowish spots were observed about the flocculi and neighbouring parts of the cerebellum. In the first two situations the softening and discolouration involved the whole thickness of the grey matter; but the subjacent white matter appeared to be unaffected. In the last situation the change was extremely slight and wholly superficial. Indeed, it seemed probable that the brain-substance itself was not involved, and that the pigmentary deposit was limited to the pia mater. With these exceptions the brain was perfectly healthy; and there was no visible damage either to the seventh or to any other of the cerebral nerves. The medulla oblongata and the cord were healthy, and presented no traces of secondary degeneration. The thoracic and abdominal viscera, including the rectum, were sound.

The results (shall I confess it?) were somewhat disappointing to me. But it is by the cases that thus disappoint us that

we learn, or are made to think. It is such cases too that ought especially to be stored up in the memory, in order that when other obscure or exceptional, or apparently misleading, cases come under observation, they may serve to illustrate or explain them, or to correct the inferences we are disposed to draw from them. Now, although there was no fracture at the base of the skull, or visible injury to any of the cerebral nerves, it is not very difficult, I think, to understand how some damage may, nevertheless, have been inflicted on the facial nerves within the skull sufficient to have induced the permanent but incomplete paralysis from which the patient suffered. The effects of contrecoup in this case were observable in all those parts of the surface of the brain which were antipodean, so to speak, to the part of the skull struck; or, in other words, in those parts of the nervous centres which were in contact with the anterior bony boundaries of the anterior, middle, and posterior fossæ of the skull severally; and the portio dura is so situated within the skull as, perhaps, to be more amenable to damage, under these circumstances, than any other cerebral nerve. The failure to discover any pathological change does not, of course, prove that no damage had been sustained.

Further, I do not think it need be assumed from the conditions found in this case that the double facial palsy observed in the first case was not due to fracture across the base of the skull, though they prove clearly enough that a blow on the head may cause such paralysis apart from fracture. But the chief interest of the case, after all, lay elsewhere—namely, in the presence of the group of non-paralytic clinical phenomena to which nothing similar existed in the first case, and in their explanation. What caused the patient's irritable apathy and apparent enfeeblement of mind? What caused his persistent rectal misery? What caused his progressive and rapid emaciation and muscular enfeeblement? To these questions, I am sorry to say, I can give no satisfactory answer. All the perceptible damage to the surface of the brain was well removed from the generally recognised motor and sensory areas; a fact which goes to explain the absence of cerebral paralysis and of impairment of the special sensory functions. Cases have been adduced to show that disease of the front part of

the anterior cerebral lobes involves a profound alteration of the moral character of the patient and enfeeblement of his intellect. On the other hand, many cases of injury of this part have been met with in which no special symptoms of importance have ensued. 'Dr. Crichton Brown, however' (I quote from Ross), 'has drawn attention to the fact that during the early stage of general paralysis of the insane, when the convolutions of the frontal lobe are particularly apt to manifest degenerative changes, the characteristic symptoms consist of 'general restlessness and unsteadiness of mind, with impairment of attention, alternating with *apathy* and *drowsiness*.' These symptoms are identical with some of the special symptoms presented by my own patient; and on the whole perhaps are such as in the present state of our knowledge might be thought likely to follow on such lesions as were found. The gradual wasting and debility, and the rectal trouble, however, seem to me at present inexplicable.

I may add that in the tenth volume of the Pathological Transactions I recorded a case pathologically identical with this; but in which the only history obtainable was that the man had been earning his livelihood subsequent to the accident (of which there was no record) which caused the superficial cerebral hæmorrhage; and that after a bout of drinking he was attacked with epileptiform convulsions, of which he died.

XVI.

TUBERCULAR MENINGITIS.¹

I HAVE brought together the following cases of tubercular meningitis, not simply because they are cases of that common though always interesting disease, but for the reason that all of them either present particular features of interest or are specially instructive.

1. In the first three cases the meningeal affection was obviously secondary, as it almost always is, to tubercular disease of the thoracic or abdominal organs. But the interesting point in relation to this association here is that either the primary tubercular disease had apparently become retrogressive if not cured, or that at any rate its symptoms had subsided, and from a clinical point of view a cure had been effected.

The first case was that of a man who had had an attack of what was regarded by his doctor as congestion of one of his lungs, from which he had recovered in the course of a few weeks. This 'congestion of the lungs' was no doubt pleurisy, and, with the subsidence of inflammation and absorption of effusion, appeared to have been cured. The tubercular character of the disease was not, and I suppose could not have been, recognised at the time. That it was tubercular, however, there is no doubt; and that it was associated with a tendency to general tuberculosis was shown by the discovery at the autopsy of small tubercular ulcers in the bowel, and of tubercles in the kidneys as well as in the membranes of the brain. The case shows how tuberculosis of serous membranes becomes apparently, though I fear for the most part only

¹ *St. Thomas's Hospital Reports*, vol. xiii.

temporarily, cured by the subsidence of the inflammation and effusion which are the main local clinical evidences of its presence.

The second case affords an even more interesting example of the same thing. In this instance the patient, some three months before his death, suffered from pleurisy with effusion on the right side. He was tapped and apparently got well. A couple of months later he had a recurrence of the same conditions on the left side, and again recovered after paracentesis. There was reason, no doubt, in this case, from the persistence of high temperature, and the repetition of the same kind of disease without definite cause, to suspect the presence of tubercles. But their existence was not proved, and no definite opinion on the matter was arrived at. After the death, however, of the patient from tubercular meningitis, it was discovered that there were miliary tubercles in the lungs, that the right pleura was obliterated by adhesions which were studded with tubercles, and that the left pleura was still the seat of pleurisy with effusion. It is not stated whether there were tubercles in connection with the latter cavity.

In the third case there was no history pointing to tubercular disease. The patient had been suffering from sciatica for some time, but was in other respects apparently well at the time when he first manifested symptoms of meningitis. At the post-mortem examination, however, it was shown conclusively that, although no recent tubercles were discovered, there had been tubercular mischief at the apex of the left lung and in the ileum.

2. The next three cases (Cases 4, 5, and 6) I group together mainly because they seem to me to bear on the question of the slow growth of tubercles in the membranes of the brain, and the development of definite symptoms only when either inflammation becomes superadded, or the growth becomes so abundant as to involve the surface of the brain itself or the cerebral nerves.

Case 4 was that of a boy eight years of age, who seems to have been in good health up to three months or so before his death, when he had an attack of rheumatic fever. From this time he complained of headache. Yet he went to school, and

about a month before his death passed an examination. A week later he began to suffer from sickness as well as from headache, and his sight is said occasionally to have been defective. At the time of his admission, five days before his death, he was complaining of headache, but was quite sensible. He soon became drowsy and died comatose. The morbid anatomy of this case was extremely interesting. There was general tuberculosis; and in the membranes of the brain tuberculosis was extensive and advanced. The only tubercles discoverable at the base were a few about the flocculi, but the fissures of Sylvius and the velum interpositum were thickly studded with them. The chief accumulation of tubercles was in a most unusual situation, namely, on the convexity and opposed surfaces of the cerebral hemispheres, near the longitudinal sulcus. Here they had run together and formed thick irregular laminæ beneath the arachnoid, with thick lamellar prolongations here and there to the bottom of the sulci. These tubercles were much too copious and too far advanced to have been developed during the few weeks in which the child showed fairly definite signs of cerebral disease. Their presence no doubt had something to do with causing the headache from which he began to suffer three months before his death, but which did not prevent him from undergoing a successful examination two months later. It is noteworthy that there was scarcely any indication of inflammation, and especially little at the base of the brain. It was doubtless owing to the comparative freedom of the latter part from disease that there was no local paralysis. The coma which came on gradually before death I am disposed to attribute to distension of the ventricles with serum.

In Case 5 failure of memory had been observed for four or five weeks before the day on which the patient's illness was said to have commenced. This was nineteen days before death; and the course of his illness was fairly characteristic. In this case much inflammatory lymph was found upon the surface of the brain, and many of the symptoms were doubtless largely due to meningeal inflammation. But the tubercles at the base of the brain were extremely abundant and had coalesced into plates; and there can be no doubt that their

earliest appearance was long antecedent, not only to the occurrence of the first definite symptoms of disease, but even to the failing memory, for which they were probably answerable.

Case 6 is especially interesting in this last respect. The patient was a general servant. She first complained of headache, drowsiness, &c., on April 9th, but she continued at work, in spite of her complaints, until the 21st. On that day she began to ramble, two days later she came into the hospital with marked cerebral symptoms, and she died in the course of three days, namely, on the 26th. The post-mortem record has been mislaid; but the examination at which I assisted made a vivid impression upon me, for on comparing the course of the patient's illness with the appearances found after death, I was struck with the abundance of the tubercular deposit and its encroachment at the bottom of the sulci on the grey matter of the brain, and the impossibility that it should have commenced with the commencement of the patient's symptoms. The amount of disease was unusually large; the duration of the case was unusually short.

3. It is curious that in the majority of cases of tubercle of the brain, either the patient has embedded tumours alone, or he has miliary tuberculosis of the membranes alone. A patient with embedded tumours, however, is always liable to the supervention of tubercular meningitis. One of the most interesting examples of that fact is furnished by a case the full particulars of which I refrain from publishing on the present occasion. It was that of a boy who when nine years of age had two epileptiform seizures which were followed by progressive evidences of cerebellar tumour, who came under my care two years later with recently developed tubercular meningitis of which he died in the course of two or three weeks, and at whose autopsy two largish tumours were found in the cerebellum, besides recent inflammation of the membranes, and the pretty abundant presence in these of miliary tubercles.

Cases 7 and 8 are examples of the same kind of association. Case 7 was a boy of 14. He had had for twelve months vague symptoms pointing to cerebral disease, and for several months had suffered from subcutaneous abscesses

arising without obvious cause in various parts of the body. On admission on May 12, he was quite sensible, but was complaining of agonising pain in the head, coming on in paroxysms and making him cry out; he presented optic neuritis of some duration, his eyesight was impaired, but he had no paralytic symptoms. He had some abscesses about his body. The pain in his head continued extreme and was only relieved by morphia injections. There were slight indications of local paralysis about the face a few days before his death, which, preceded by coma, occurred six days after admission.

At the post-mortem examination a good many small tubercular tumours were found embedded in the substance of the cerebrum and cerebellum. There were also miliary tubercles in the membranes at the base, especially in the fissures of Sylvius, but no definite signs of meningeal inflammation. Indeed, I am inclined to think that although some of the symptoms which he exhibited during the last day or two of life were probably due to the meningeal complication, the chief symptoms, and those which were instrumental in causing death (such as his intense headache and his coma), were attributable to the tumours. The abscesses which arose from time to time during the last few months of his life were a puzzle to us. At one time it was thought they might be pyæmic, especially as there was a history of ear-disease. But no active ear-disease was found, and their cause remains a mystery.

Case 8 is that of a girl two years old, who had been irritable and drowsy for a few months, but whose actual illness was supposed to have begun on July 1, when diarrhœa, vomiting, irritability, and drowsiness came on. She was admitted on the 6th, and was then, and continued, drowsy and irritable, with low temperature and slow, somewhat irregular, pulse. But she had no paralysis, no fits, and there was no optic neuritis. On the 17th the pulse became rapid, the temperature rose, and the drowsiness increased. On the 18th the temperature, having fallen to 96° in the morning, continued to rise during the remainder of the day; and shortly before her death, which occurred early on the morning of the 19th, it reached 109°. The head only was examined. Three moderate-

sized tumours were found in different parts of the brain, and the lateral ventricles were distended with fluid. There was no congestion of the surface of the brain and no lymph; but in the fissures of Sylvius there were numerous miliary tubercles. It is doubtful whether the child had really tubercular meningitis. If it had, both that and the symptoms due to it were slight and comparatively unimportant. I am inclined to believe that the symptoms were fully accounted for by the tumours, and the dropsy of the ventricles, and that the meningeal tuberculosis was at that early stage at which, as a general rule, there are no definite symptoms of its presence.

4. Case 9 is interesting mainly from the fact that there was tubercular meningitis, attended with quite characteristic symptoms, while no trace of tubercular disease was discovered in any other part of the organism. The disease of the meninges was, so far as we could judge, primary.

I have added Case 10 to the list chiefly because it is an example of a kind of case which is not uncommon, wherein the symptoms presented by the patient have, at any rate for a time, a close resemblance to those of delirium tremens. The patient was a young, healthy-looking fellow, who was said to have been somewhat fast, and to have had, during the previous two years, two or three similar but slighter attacks. The progress of the case soon cleared up all doubt as to its nature.

5. Before concluding the few remarks with which I venture to introduce my cases, I should like to refer to two or three points which they illustrate, but to which I have not alluded in the foregoing observations.

Distension of the lateral ventricles with serous fluid is one of the most common incidents of death from meningeal tubercle, and its presence is expressly noted in all my cases, excepting 3, 7, and 10. It is difficult of course to say in any one case how much of the patient's condition as regards symptoms depends on such effusion, inasmuch as we know that the brain, as well as other organs, accommodates itself in a marvellous way to pressure slowly induced. There can be little doubt, however, that in many cases the accumulation causes drowsiness, coma, and more or less general even though

slight paresis, and that such symptoms coming on towards the close of the disease are often mainly referrible to this cause.

Optic neuritis is one of the most important indications of the presence of meningitis, as it is also of the presence of tumours; and in tubercular meningitis it generally appears sooner or later. Among my own cases there are two or three in which the condition of the discs is not referred to, either because it was not investigated or because the note of the fact has been lost. Optic neuritis was present in Cases 1, 4, 7, 9; it was absent in Cases 2 and 8.

Paralysis of one or more of the cerebral nerves generally appears in the course of tubercular meningitis, and occasionally also more or less well-marked hemiplegia. In four of my cases no paralysis of any kind was observed from first to last. As regards two, this is not surprising, for one of them was the case in which the tubercle was almost wholly at the vertex, the base (with the exception of the fissures of Sylvius) being almost completely free from disease; and the other was a case in which also the affection of the base was limited to the presence of tubercles in the fissures of Sylvius. In one case the chief evidence of paralysis was that the patient saw double; towards the end his eyes diverged. In one, slight affection of one hypoglossal and of the motor nerve of one side of the face was suspected. In four the paralysis was limited to one of the third nerves, and was indicated by dilatation and immobility of the pupil, ptosis, and almost complete immobility of the eyeball. No other varieties of paralysis were observed.

Convulsions were absent in six of the cases from first to last. In one case a fit seems to have ushered in definite symptoms; but the phenomena of the fit are not recorded. There was no recurrence. There were only three cases attended with convulsions. In one they came on a few hours before death, in one the day before death, and in the third three days before death.

The temperature, as is well known, varies remarkably in this disease, and my cases accord with common experience. Some facts with respect to temperature are recorded in all

but one, and in all of these the temperature was at some time or other above the normal. In one (1st) it never rose above $100\cdot8^{\circ}$, and sank to $98\cdot4^{\circ}$ just before death, at which time the pulse was 90. In one (2nd) the variations were between 100° and $103\cdot4^{\circ}$, but it sank to 98° at the time of death. In another (4th) it ranged from $99\cdot2^{\circ}$ to $102\cdot6^{\circ}$, but fell during the last two days to $95\cdot2^{\circ}$, being $95\cdot4^{\circ}$ just before death; at which time the pulse (which had been 132) fell to 66. In another case (5th) the temperature varied from $101\cdot2^{\circ}$ to 102° , the pulse generally varying from 72 to 88. Before death the temperature was $102\cdot2^{\circ}$, the pulse 140. In another case (6th) the temperature lay between 102° and 103° , and reached $102\cdot6^{\circ}$ at death. The pulse, which was 76 on admission, rose gradually to 160. In another (7th) the temperature was $104\cdot2^{\circ}$ shortly after admission, but varied during the rest of the patient's life from $99\cdot2^{\circ}$ to $100\cdot5^{\circ}$, the pulse varying from 75 to 92. In a child of two (8th) the temperature ranged between 96° and 99° , and the pulse was about 66. But the day before death the temperature began to rise, and at death it had reached 109° . The pulse was 132 when the temperature was 102° . In another instance (9th) the temperature was generally between $100\cdot6^{\circ}$ and $101\cdot8^{\circ}$, but it rose rapidly at last, and just before death reached 107° . When it was 102° the respirations were 55 and the pulse 189.

I make no attempt to explain these differences. But it is certainly curious that in some cases the temperature should fall notably as death approaches, while in other cases it should rise rapidly and to a considerable height.

CASE 1.—*Tubercular pleurisy, apparently cured, followed by tubercular meningitis, optic neuritis, facial paralysis, convulsions.*

Samuel T., a packer, æt. 32, was admitted under my care on May 30, 1884.

He was said to have been always healthy up to three months ago, when he had an attack of 'congestion' of the left lung, on account of which he had to lie up for several weeks. But he recovered, it was stated, perfectly, and was able to resume his occupation. He continued well up to May 17, when he came home from

work complaining of pain in the head and sickness. These symptoms continued; and on the 25th he became restless and strange in manner.

A fairly-nourished man, with a flushed face. He is extremely restless, moving his arms about constantly, sometimes seeming to point at some object, sometimes scratching, sometimes picking at the bedclothes. He is continually talking or singing. His talk for the most part is unintelligible, but now and then a few words can be distinguished. When spoken to he usually tries to answer, and to do as he is told, but he seems unable to put out his tongue. He often moves his mouth and tongue as if chewing. He is somewhat inclined to be merry, and says he has no pain in the head. He has right facial paralysis, but no affection of the ocular muscles or of the pupils. No paralysis of limbs. The optic discs are hazy and congested (especially the right), but there is no swelling or hæmorrhage.

Thoracic organs apparently normal. Appetite fair; no sickness; no difficulty in swallowing. The urine had to be drawn off with the catheter; it was dark, sp. gr. 1020, and contained a trace of albumen. Pulse 120, resp. 30, temp. 99·6°.

31st.—Much quieter than he was, but he is less sensible, his speech is more indistinct, and he is weaker. The water has to be drawn off. Temp. 100·8°.

June 1st.—He passed a fair night and continued very quiet up to 10.30 A.M. At that time he became slightly convulsed and insensible, and his breathing laborious. These symptoms continued without much change; and about three o'clock, when I saw him, he was still insensible, and sinking. At this time his temperature was 98·4°, his pulse 90, and his respirations 24, but stertorous and attended with much effort. He died shortly afterwards.

Post-mortem Examination.—The convolutions of the convexity of the hemispheres were flattened. There was a good deal of sub-arachnoid fluid at the base, and much thick, œdematous lymph on and between the crura cerebri. The fissures of Sylvius were adherent, and in them were numerous miliary tubercles. The ventricles were distended with clear fluid and the parts about them were softened. There were no tumours.

The right pleura was firmly adherent. The left was lined throughout with firm, slightly translucent lymph, thickly studded with miliary tubercles. At the upper part the opposed surfaces were adherent. The lower part of the cavity contained about a pint of serum. The adhesions were no doubt the result of the thoracic

mischief from which he suffered some little time before death. The lungs were healthy, and no tubercles were discovered in them.

With one or two slight exceptions all other organs were healthy. The kidneys contained a few small tubercles; and two or three small round ulcers were found in the lower part of the ileum.

CASE 2.—Two consecutive attacks of pleurisy, one on each side; paracentesis, followed by convalescence in each case; subsequent tubercular meningitis; miliary tubercles in lungs and pleura.

Thomas S., æt. 32, a gardener, was admitted into hospital under Dr. Harley on November 23, 1883, presenting symptoms of tubercular meningitis.

He had been in the hospital in August for effusion of fluid into the right pleura. Paracentesis was performed, and the fluid did not re-collect. He was again under treatment in October for effusion into the left pleura, for which he was tapped. There was very little reaccumulation when he left the hospital at the end of October. On both occasions he had considerable matutinal and evening rises of temperature, sweated much at night, became weak and lost flesh; but no signs of pulmonary disease were detected.

On November 16 he first complained of pain in the head and giddiness. He gradually got worse; and his friends observed that he was strange in manner.

On the 23rd, when admitted, he was evidently much weaker than when he left the hospital. He complained of frontal pain, but no other evidence of brain-disease was observed. He had no cough. Expansion of the left side of the chest was defective. There was diminished resonance over the lower third without much alteration of the voice- and breath-sounds, but there was fine crepitation at the base laterally. Right side of chest, heart, and abdomen natural. Tongue thickly coated. Bowels confined. Urine clear, dark, 1020, free from albumen.

On the 25th it was noticed that he was sleepy and answered questions badly. He complained of pain in head and along back, and he was constantly making irregular jerky movements. During the next few days he was at one time sleepy, at another time noisy and talking incoherently; and his water had to be drawn off once or twice.

On the 28th, after a very noisy night, the left pupil was found to be larger than the other. Otherwise his condition remained unchanged.

December 1st.—Talking all night, in spite of chloral and

hemiparesis. To-day lies curled up, and is constantly chattering incoherently. The left pupil remains larger than the other, and inactive. Optic discs normal. In the evening he became unconscious and his breathing laboured; and he continued thus until the next morning, when he died. He had not, at any time, definite paralysis or spasm of the ocular or facial muscles, or of the extremities, nor ever any fit.

His temperature during the greater part of his stay in the hospital ranged from 100° to 103·4°. On the day before death it sank for the first time to 98·6°, and just before he died it was 98°.

Autopsy.—No marked congestion of pia mater. The convex surface of the hemispheres was flattened. There was much serous fluid at the base. The anterior half of the pons, the crura cerebri, and the chiasma were covered with thick oedematous-looking lymph. Numerous miliary tubercles were found along the vessels in the fissures of Sylvius. The ventricles were distended with serous fluid and their walls were softened.

The right pleura presented moderately old adhesions, and was studded with miliary tubercles. The left pleura presented recent inflammation; a thick layer of lymph covered the lower two-thirds of the lung, and the cavity contained a pint and a half of turbid fluid. The lungs presented miliary tubercles in the upper lobes, the left being most affected.

All other organs were healthy.

CASE 3.—Old tuberculosis of lung and bowel; tubercular meningitis.

C., a tailor, *æt.* 42, had suffered from sciatica on left side for two or three months, and was getting better, when about five days ago he became feverish, and has since been suffering from symptoms having some resemblance to those of enteric fever. He has had quick pulse and elevation of temperature, and has been rambling. He was of temperate habits, and had had no serious illness.

I saw him with his medical attendant on the morning of May 19, 1884. At that time he was rambling, talkative, appeared to have hallucinations, and was constantly trying to get out of bed. He had been passing his water into the bed. His tongue was dry; there was no evidence of pulmonary disease; his heart-sounds were healthy, pulse 104; there was no pain, tenderness, or swelling of the belly; the bowels were not loose; no rash could be seen; his temperature was 102°. No discoverable disease in thigh or hip. No squint or affection of pupils, and no paralysis.

He gradually got worse, and died comatose on the 21st. He had no fits.

At the post-mortem examination, at which I was present, there was found: congestion of the surface of the brain, with lymph in the subarachnoid tissue; much thickening and opacity of the membranes at the base, together with some recent lymph, and distinct but not very abundant miliary tubercles in the same situation; induration, scarring, and puckering of the left apex, with two or three minute cavities, all of old date; no tubercles in either lung; and a few small healing ulcers in the ileum. No other disease.

CASE 4.—*General tuberculosis; tubercle of the convex surface of the cerebrum; effusion into the ventricles; optic neuritis; convulsions.*

William M., a schoolboy, æt. 8, was admitted under my care on July 16.

Last April he had an attack of rheumatic fever. He was only in bed for a week, but he continued poorly subsequently. He has complained pretty constantly of pain in the forehead; has had palpitation and shortness of breath; for a week or two has had a little weakness on the right side, and since July 1 has occasionally been sick. Has had no failure of sight. About a month ago he passed an examination at a Board School. From the 2nd until the 16th of July he was at some convalescent home.

On admission he complained of headache, but was perfectly sensible and presented no sign of paralysis; the tongue was coated but moist; his respirations quiet; his pulse 78, full, soft, and regular; there were no signs of cardiac or pulmonary disease; his abdominal organs seemed healthy, and his urine was free from albumen. He had no rheumatism. There was a rash, probably urticaria, on the chest and arms. Temperature 99·8°.

On the 18th his general condition remained much the same, but since admission he had always lain in bed with his face turned to the right and his neck stiff, and painful when moved. There was marked tache cérébrale. Double optic neuritis was present. 'One or two small hæmorrhages in each eye. Considerable swelling and congestion of each disc. Vessels buried at margin. Left neuritis probably older than right.' No paralysis of ocular muscles or of any other part.

20th.—Drowsy, passing evacuations in bed. Sensible; complains of headache; lies in same position as before; upper cervical spines tender; no convulsions; no hydrocephalic cry; no paralysis;

no retraction of head or of abdomen; no vomiting; bowels confined. Pulse 133. Six leeches were applied behind the ears, and there was free bleeding.

21st.—Remained much the same until 3 P.M., when he was attacked with a succession of fits, lasting altogether about an hour and a half. In these the right arm and leg were chiefly convulsed. He remained unconscious afterwards. At 8.30 he became rigid for ten minutes. After this, though he lay quiet and took no notice of anything, he could be roused, appeared to be free from headache, and showed objection to being disturbed or moved. About this time his pulse was 60, somewhat irregular, and his respirations markedly of the Cheyne-Stokes character. He still had no sickness and was able to swallow. His evacuations were still passed into the bed.

On the 22nd the child was wholly unconscious, and made no attempt to swallow. His breathing was noisy; his pulse 68, slightly irregular; his conjunctivæ insensible; and his right arm rigid.

He continued comatose, and died in this condition.

It may be here pointed out, that the patient had no fits, excepting on the 21st, that he had no vomiting while in the hospital, that he never presented the hydrocephalic cry, that he had at no time any paralytic affection of the pupils or motor nerves of the eyes, face, or tongue, and that the only signs we ever observed of one-sided paralysis came on during the fits; and finally, that the temperature, which up to the 20th varied between 99.2° and 102.6° , sunk to the normal on the evening of the 20th, that on the 21st it fell gradually (notwithstanding the fits) until it stood at 95.2° in the evening. On the 22nd it was still only 95.4° .

Autopsy.—On removing the dura mater the convolutions were found flattened, the surface dry, and uniformly congested. All along the margins of the longitudinal fissure were scattered numerous tubercles. These extended for a short distance over the convex surface of the hemispheres, and were more or less abundant over the opposed surfaces down to the corpus callosum. Generally they were small, grey granules, and might have passed for Pacchionian bodies. But those occupying the neighbourhood of the middle half of the fissure were of larger size, opaque, and buff-coloured, and had run together into irregular patches. They looked, in fact, at first sight, like patches of ordinary inflammatory lymph. Further examination, however, showed that they were nodules and tracts of cheesy tubercles, in some parts from one twelfth to one-eighth of an inch in thickness. Similar deposits were found within and even at the bottom of some of the sulci con-

connected with the flat surface of the hemispheres in the neighbourhood of the vertex. On removing the brain, its under surface was found to be much less congested than its upper surface; the cerebellum, in fact, and all the parts occupying the central line being unusually pale; and there was much accumulation of slightly opaline serous fluid in the subarachnoid space. At first sight there was no evidence of inflammation or of tubercles in this situation. Further examination, however, showed that there were a few grey granules about the flocculi, and that the duplicatures of pia mater in the fissures of Sylvius were much congested, thickened, and closely studded with grey tubercles. There were absolutely none at the actual base of the brain excepting, as just stated, about the flocculi. The lateral ventricles were much dilated, and contained a large quantity of serous fluid; the white matter immediately bounding them and the fornix were softened into a pulp. The hinder part of the velum interpositum was much thickened and contained tubercles.

The pleuræ presented numerous miliary tubercles. The lungs were studded thickly with masses of cheese-like tubercles, which had here and there broken down into small cavities. The peritoneum was dotted with tubercles, and caseous masses were found in the spleen and liver. Some of those in the latter organ were broken down into cavities. All other organs were healthy.

CASE 5.—Tubercular meningitis; first symptom a fit, then drowsiness, partial coma, affection of sight, and paralysis of muscles of right eyeball.

J. W., a potman, æt. 37, was admitted on September 8, 1871. He is said to have had good health previously to his present illness. He had been observed to be failing in his memory for four or five weeks, when in the afternoon of August 28, after tea, he was missing for about twenty minutes, and then walked into the bar, looking queer, with a severe wound on the head. When asked, by a medical man who was sent for, what was the matter, he said he did not know, and seemed not to know; but he was not paralysed, and did what he was told. The next day he was able to say more about himself, and stated that he recollected becoming giddy, but nothing further until he got up and walked into the bar. On the 30th he went about his work, but felt very tired in the afternoon and retired to bed. For two days more he tried to work, and then gave up entirely. He seemed then gradually to lose the power of speech, at all events the power of getting his words out, and to

become nervous and irritable, putting his hand frequently to his head; and subsequently he got drowsy. But he took his food, and retained the power of walking, up to the time of coming to the hospital.

On admission, and for some days subsequently, he was much in the condition above described. He was drowsy, slow to speak, but answering rationally, and appeared to have some headache; but there was no paralysis of any part; neither was affection of the abdominal or thoracic viscera, or rash, detected. His temperature varied from 101.2° to 102° , his pulse from 72 to 88, and his respirations from 28 to 32. During this period a purge of castor-oil and one of croton oil were administered, and four ounces of wine were ordered daily.

September 18th.—Constantly groaning and occasionally muttering; answers questions slowly but rationally, saying a few appropriate words indistinctly. 11 A.M. Temp. 100.3° , pulse 84. Head to be shaved, ice-bag to head.

15th.—Morning: Lies groaning and muttering, and constantly fidgeting with the bedclothes. Pupils dilated and insensible to light, but he can see dimly. Pulse rather irregular. *Haust. sennæ co. statim.* 3 P.M.—Constant low moaning and muttering, no paralysis of limbs, constantly fidgeting with the hands. There is now (since the morning) ptosis of right eyelid, and apparently almost complete paralysis of muscles of right eyeball with dilated and insensible pupil. The left eyeball moves freely in all directions, and the pupil is somewhat contracted, and does not undergo appreciable change on exposure to light. Very doubtful if he sees. He is too noisy and restless to allow of useful examination of the chest. Pulse 120; urine acid, free from albumen and sugar, sp. gr. 1026. 7 P.M.—Temp. 100.2° , pulse 120.

16th.—9.15 A.M.—Temp. 102.5° , pulse 130. 10 A.M.—Temp. 102.2° , pulse 140. Quite unconscious and quiet, no groaning. Eyes closed, right more perfectly than left. Right eyeball quite motionless when exposed, with dilated pupil; left moving pretty freely, pupil small. He died at 1.30 P.M.

It may be added that the patient had no fit of any kind while in the hospital, that during the last few days his evacuations were passed unconsciously, that he had no cough, and lastly that, though there was gradual aggravation of his cerebral and other symptoms (such as impairment of intelligence and of power of speech, muttering, fidgetiness, &c.), there was never any obvious proof of paralysis until the day before death.

Autopsy.—Dura mater tense. Convolutions flattened on upper

surface of brain. Much yellow lymph at base of brain, especially along Sylvian fissures, and over optic chiasma and parts between this and the pons. It extended thence over the pons, medulla oblongata, under surface of the cerebellum, and along the velum interpositum. Some also was present in the sulci at the sides of the cerebrum. The margins of the Sylvian fissures were firmly adherent, and on separating them tubercles were found to be abundantly present in them, and extending thence to the bottom of the sulci between most of the convolutions connected therewith. These were grey, hard, closely aggregated, in many cases as large as a hemp-seed, and had in many parts run together into irregular flat masses, moulded to the deeper parts of the sulci, and encroaching on the brain-substance. Tubercles were also scattered over the central area of the base of the brain. There was much congestion of the pia mater in the affected regions. Brain-substance generally healthy. The lateral and other ventricles were distended with fluid.

In the apex of the right lung were two caseous masses, the larger of which was as big as a hazel-nut, and in their immediate vicinity a good many miliary tubercles. There was no further disease in this lung. No tubercles were found in the left lung or elsewhere in the body.

The remaining organs were healthy.

CASE 6.—*Tubercular meningitis; symptoms of very short duration; headache, drowsiness, and incoherence; affection of ocular muscles.*

Sarah A. T., a servant, æt. 27, was admitted under my care on April 23, 1877. She had returned to her situation from an Easter holiday on April 9, and complained on arriving of headache, irritability, loss of appetite, and drowsiness. Her headache and irritability persisted, but she continued to do her work up to two days before admission. On the 21st she got up and had a good breakfast, though she was still complaining of her head, and shortly afterwards she was found sitting in front of the fire with a vacant look, and in evident confusion of mind. Towards the evening she became 'delirious.' She remained drowsy and stupid, and was brought to St. Thomas's about 6 P.M. on the day of admission.

She was then very drowsy and somewhat difficult to rouse, but was sensible and complained of frontal headache, and lay with the head somewhat retracted. The pupils were dilated and equal, and acted slightly to light. No paralysis of any part. Tongue thickly

coated; sordes on teeth; no sickness; bowels confined. Heart and lungs apparently healthy. Pulse 76, resp. 44, temp. 102°.

24th.—In much the same state. Muscles of neck rigid. In the morning pulse 84, resp. 36, temp. 101·8°; in the evening, pulse 116, temp. 102·2°. Passed her water into the bed.

25th.—In the morning was drowsy, but sensible when aroused, and recognised her friends. Said her head ached very little. Tongue brown and dry. Bowels not open since admission. Pulse 128, temp. 102°. Urine (which had to be drawn off) sp. gr. 1018, one sixth albumen. 2 P.M.—Almost insensible, constantly chattering indistinctly. Right eyeball moves independently of left, which is generally stationary. Pulse 152, temp. 102·2°. 11 P.M. Still chattering, but not intelligibly. Pupils insensible to light. Pulse 154, temp. 103°.

26th.—Insensible and sinking throughout the day. Pupils unequal (left dilated, right contracted), not acting to light. The pulse was 160 in the morning, at which time the temperature was 102°; this rose during the day to 103·6°. Death occurred at 6 P.M.

The patient had neither sickness nor convulsions, nor any paralysis excepting the imperfect paralysis of some of the ocular muscles.

At the post-mortem examination (of which the detailed account has been mislaid) there was found extensive tubercular meningitis, the tubercles being very abundant and concreted into irregular plates at the bottom of many of the sulci connected with the fissures of Sylvius. The ventricles contained much fluid. Numerous tubercles were scattered throughout the lungs.

CASE 7.—Tubercle of brain; tubercular meningitis; history of otorrhœa; subcutaneous abscesses; extreme pain in head; optic neuritis.

William B., an errand boy, æt. 14, was admitted under my care on May 12, 1888. When five years old he had measles; and from that time, or a little earlier, he had a discharge from one of his ears, which continued on and off until he was seven. Nine months ago he had a return of the discharge, lasting for a fortnight. About a year back the patient began to be listless and indisposed to move about; and eight or nine months ago he had an attack of 'low fever,' which remained on him for two weeks. After this he went to work at a portfolio-maker's as an errand-boy, but at the end of about three months was discharged as 'unfit for work.' On

several occasions during this period had fallen down from giddiness on crossing the road, and been nearly run over. For the last four months he has suffered from nausea and vomiting, and the bowels have been constipated. Three months ago he became a surgical out-patient with abscesses of the face and leg; since then, several others have made their appearance in the abdominal walls and the extremities. He has had severe pain in the head and back of the neck during the last six weeks, and has slept badly, waking up with a start and screaming. His eyesight has become much impaired of late. He has had no fits and no rigors.

On admission he was not an unhealthy-looking lad, and was quite sensible. But he was suffering from intense pain in the head (not referred to any special part) and in the neck, which was constant, but attended with exacerbations coming on every minute or two and making him cry out. He could stand and walk a little, but fell about, as though from giddiness, when upright. He had no paralysis of face, tongue, eye-muscles, or any other part, but his sight was dim, so that he could not distinguish the forms of objects at a little distance. No colour-blindness. 'Pupils normal. Double optic neuritis, more intense in the left than in the right eye, where also there are white patches in the retina. No hæmorrhages. The changes are of many weeks' duration' (Mr. Nettle-ship). The head was kept very still, every movement of it aggravating the pain down the neck.

On either forearm, just above the wrist, was a fluctuating swelling about as large as a chestnut, and there were three or four larger ones on the legs; and on several other parts of his person were the scars of abscesses which had discharged and healed recently. None of the joints were affected. There was no evidence whatever of thoracic or abdominal disease. The urine was free from albumen. The heart's action was very variable, the pulse being at one time rapid, at another slow. He did not complain of earache; neither was there any discharge from the ear. The temperature was 99·8° on admission, but at night rose to 104·2°.

On the 14th it was remarked that he had been much relieved by one or two subcutaneous injections of morphia (gr. $\frac{1}{8}$), which had also sent him to sleep. But when the effects had passed off he was still suffering from intense pain in the head and still constantly screaming out. There was general hyperæsthesia; and his respirations, as well as his pulse, were irregular.

During the next two days there was little change. The patient was still kept largely under the influence of morphia, which gave

him ease, and immediate, prolonged, and profound sleep. At times, however, he woke up, and then all his old pains and screaming returned. On the 15th it was thought that the tongue was protruded slightly to the right; on the 16th ptosis of the left upper eyelid was observed; and on the 17th there was a slight indication of left facial palsy. But on this day he was only partially conscious.

He was semi-conscious during the night of the 17th, but became comatose during the morning of the 18th, and died, without further material change, at 3 P.M.

It may be added, that the bowels were much constipated while he was in the hospital; that the urine generally contained phosphates, but on the day of his death presented also a little albumen; that the temperature after the first night never rose above 101.6° , and generally varied between 99.2° and 100.5° ; and that the pulse ranged from about 75 to 92. On the day of the boy's death Mr. Clutton examined the left ear, and found it apparently free from disease. The right he was unable to investigate.

Autopsy.—Body well nourished. There was an abscess beneath the skin of the left forearm, and another similar one on the outer side of the left leg, each of which contained about two drachms of pus.

The surface of the brain was flattened and dry. The pia mater over the convexity of the hemispheres was congested. At the base the membranes were opaque and thickened, especially in the fissures of Sylvius, where there were numerous miliary tubercles. There were very few tubercles in the interpeduncular space or elsewhere at the base. No recent inflammatory lymph was discovered.

In the substance of the cerebrum were several masses of yellow tubercle about the size of peas: one in the cortex of the under surface of the left temporo-sphenoidal lobe; two in the cortex of the upper part of the left præfrontal lobe; one in the right first frontal convolution near its junction with the ascending frontal; and three or four in the left centrum ovale majus.

The cerebellum presented two similar masses: one in the outer border of the left lobe, and one in the corresponding situation on the other side.

The pons, crura, medulla oblongata, and ganglia at the base of the brain were healthy.

The pleuræ were studded with miliary tubercles and were partially adherent.

The lungs presented numerous scattered tubercles of the same

kind, and in the apices a few larger masses of yellow tubercle. No cavities were discovered.

There were a few tubercles in and upon the liver and spleen, and a few tubercular ulcers in the large intestine.

All other organs were healthy.

CASE 8.—Tubercular tumours in the brain; deposit of miliary tubercles in the fissures of Sylvius, without meningitis; drop-sical accumulation in the ventricles; great drowsiness; absence of fits, paralysis, and optic neuritis. Death with high temperature.

Annie C., a little girl two years old, was admitted into the hospital under my care on July 6, 1883. A few months before she had been irritable and drowsy. But her present illness was supposed to have commenced on July 1, when she was attacked with diarrhœa, vomiting after food, loss of appetite, and inability to stand. She also again became irritable and drowsy and apt to scream at times.

On admission she was fairly plump, but drowsy and fretful on being disturbed; she did not seem in pain and had no photophobia; the bowels were relaxed, the motions being dark.

During the next week the child continued drowsy and irritable, but there was no vomiting or diarrhœa; the pulse was irregular and about 66 in the minute; the respirations were quiet and natural; the vessels of the eyelids were congested. There were no fits, no paralysis; and the temperature varied between 96·8° and 99°.

On the 12th the eyes were examined ophthalmoscopically and found healthy.

On the 13th the face was noticed to flush up at times, and a little twitching was observed on its left side.

The child continued very drowsy, the temperature low, the pulse slow and irregular, and the bowels confined until the 17th. On that day the temperature rose from 96° in the morning to 101·2° in the evening; the pulse increased to 132; and it was noticed that the tache cérébrale was very distinct; the general condition, however, remained unchanged.

On the 18th she was still difficult to rouse, and suffered from retention of urine. At 9 A.M. the temperature was 96°; at 2 P.M. 102°; at 5 P.M. 103°; and it varied between this and 102° during the remainder of the day. At midnight it stood at 104°, and at 3.15 a short time before death, it had risen to 109°. The surface was flushed, and, there was much perspiration.

No fits, no paralysis, no affection of the eyes or pupils were ever observed; and while the child was in the hospital there was never any sickness. The most noticeable feature of her illness was her constant drowsiness.

Autopsy.—The head only was allowed to be examined. On removing the dura mater the convolutions of the brain appeared flattened and the surface dry. There was no congestion. On removing the brain the under surface was seen to be pale, and a considerable quantity of subarachnoid fluid was found in this situation. No tubercles were recognised in connection with any part of the superficial pia mater, but on opening the fissures of Sylvius, the pia mater within them was discovered to be thickened, hardened, and dotted pretty thickly with minute grey tubercles. The brain-substance was generally soft, and the lateral ventricles were largely distended with serous fluid. On careful examination three tubercular masses were discovered: one, the size of a small cherry, in the anterior part of the optic thalamus, and encroaching on the neighbouring internal capsule; one, the size of a pea, in the anterior part of the left cerebral hemisphere; and a third, also about as large as a cherry, embedded in the posterior part of the middle lobe of the cerebellum, but connected with the surface.

CASE 9.—*Tubercular meningitis, no tubercles in chest or abdomen; convulsions; optic neuritis; partial paralysis of right third nerve, &c. Death, with high temperature.*

James S. W., a schoolboy, æt. 7, admitted under my care on September 12, 1882. He began to be ill on the first of the month, when he complained of pain in the head and feeling tired. Since then he has been gradually getting worse. The headache has increased, he has been very fretful, he has often woke up from sleep screaming, and has had frequent convulsions of the right arm and leg. There has been no sickness, and the bowels have been constipated. Yesterday he complained of pain in the back of the neck, and he rambled.

He is anæmic and delicate-looking, and complains of pain in the back of the head, which also runs down the neck. The right eyelid droops, and on trying to look upwards the right eye lags. No other ocular paralysis. Pupils equal, acting to light and accommodation. Sight fairly good. Double optic neuritis. The left side of the face seems a little weaker than the right. Tongue protruded straight. No paralysis of limbs. No loss or impairment of sensation.

He is very irritable; at one moment is asleep, then wakes with a plaintive cry, two or three times repeated; at one moment he is lying down, then rises to the sitting posture, throws his arms about, and falls down again. He can be roused to answer questions, and responds to his name, but is constantly rambling when awake. At one time he cries for his father and mother, frequently he sings snatches of popular airs, and at times he fancies he is feeling in his pockets for money. Tache cérébrale fairly well-marked. Nothing abnormal in chest or abdomen. Tongue clean. Motions passed into the bed. His breathing is of the Cheyne-Stokes character. Temperature from $100\cdot6^{\circ}$ to $101\cdot8^{\circ}$; pulse 72.

14th.—More drowsy and difficult to rouse; no squinting, no additional paralytic symptoms. Takes food less readily than he did, but is not sick. Cries out at times. Has had several attacks of convulsions of the left side of the body to-day and yesterday. The water has had to be drawn off. The respirations, which continue more or less of the same character as before, have been about 30 in the minute; the temperature has varied between 100° and $101\cdot8^{\circ}$; the pulse between 78 and 130.

15th.—At 7 A.M. he had a general convulsive attack. At that time his temperature was $101\cdot2^{\circ}$. At 10.30 P.M. he was insensible, breathing noisily and irregularly, and at the rate of 56 in the minute; his pulse was 189; his temperature 102° ; his eyes moved independently of one another, and the pupils, which were widely dilated, did not respond to light. From this time he gradually sank, and the temperature rose rapidly. At noon it was $105\cdot2^{\circ}$; at 4, $105\cdot8^{\circ}$, and at 8 (just before his death), $107\cdot3^{\circ}$. He had several convulsions during the day.

Post-mortem Examination.—The surface of the brain was generally congested. There was some opacity and thickening of the membranes over the pons, and in the interpeduncular space, and some recent inflammatory lymph along the Sylvian fissures. The right fissure was more affected than the left, and the right third nerve was more embedded in adventitious matter than the other. Only a few miliary tubercles were discovered. The substance of the brain generally was healthy. The lateral ventricles were distended with fluid. There were a few miliary tubercles in the spinal arachnoid.

A little recent lymph between the lobes of the left lung, and some broncho-pneumonia of the lower lobe. Right lung and pleura healthy. All the other organs were healthy, and no tubercles were found anywhere in them.

CASE 10.—*Tubercular meningitis ; symptoms much resembling those of delirium tremens ; double vision ; no other paralysis ; no convulsions.*

R. W. D., a clerk, æt. 21, was admitted under my care on May 14, 1868. He was a well-made, well-conditioned young man. He stated that his present illness began fourteen days before admission with severe pain about his right shoulder, which was followed the next day by pain across the forehead, eyes, and cheekbones. The latter pain has continued, and prevented him from sleeping at night. He has occasionally seen double. His appetite has been bad, his bowels constipated, but there has been no sickness or nausea, and he has had no cough. He said that he had a similar attack to the present in 1866, and that since then he has had one or two slight attacks of the same kind. His mother and brother died of consumption. He now complains of pain across the forehead and double vision, and his temples are somewhat tender. The eyes look healthy, and the pupils contract readily. He is very weak and somewhat tremulous, but there is no paralysis, and no apparent affection of any of his organs of sense beyond that already adverted to. He appears to understand everything that is said to him, and answers rationally. Tongue fairly clean ; pulse 84 ; heart-sounds and breath-sounds healthy.

Ordered on admission to be blistered on the back of the neck, milk diet, and beef-tea ; next day five grains of quinine three times a day.

18th.—Seems much worse. Has been very garrulous ever since admission, and has had little sleep. Indeed he has at no time slept for more than a hour at a time, and has not slept at all during the last forty-eight hours. He is now very feeble, so feeble that he cannot raise himself in bed, and his arms and legs tremble, especially when he tries to move them. His lips also are tremulous when he speaks. He now chatters almost incessantly, answering questions readily, and for the most part speaking rationally, but every now and then becoming a little incoherent. He seems to understand very well everything that is said to him and everything he observes about him, and is not in any degree maniacal or apparently under the influence of delusions. He complains chiefly of pain across the eyes, but says also that he has pains all over him. Pupils dilated, but contracting readily to light. Sees double. Skin natural ; no rash. Tongue dry, furred, and fissured ; somewhat thirsty ; little appetite ; no sickness. Bowels relieved yester-

day. Neither motions nor urine passed involuntarily. Urine free from albumen. Heart's sounds healthy. Pulse 84. Chest resonant; breath-sounds healthy, except that the expiratory murmur seems prolonged at both apices; no cough. No abdominal enlargement or tenderness.

21st.—Still gets worse. Has scarcely had any sleep. Has still been talking constantly, and has now and then been troublesome. The urine has been several times passed in bed, and the bowels were yesterday relieved into the bed after the use of an enema. Has continued generally tremulous; he answers rationally when spoken to, but when left to himself chatters incessantly incoherently and on all sorts of subjects, sometimes preaching, sometimes talking of business. Pupils dilated, but acting to light; when a pen or pencil is held up before him he says there are two. Tongue furred and dryish. No sickness. Breathing rapid. No cough. Skin not dry. Liq. morph. hydrochlor. ʒiij. ex Aq. camph. h. n. Wine 6 ounces.

22nd.—Slept a little last night after his morphia. Is much quieter this morning, and evidently still under its influence. The pupils are contracted. He still chatters quietly, and his lips are tremulous. Tongue dry. Skin dry. Pulse 120. Head to be shaved. Ice to the head. Ol. tigllii mj. statim.

23rd.—The croton oil acted violently, and all the evacuations (except the first) were passed into the bed. Has slept fairly well. Still chatters a little at times, but not nearly so much as he did. Answers sensibly. His limbs are less tremulous. No apparent paralysis. Tongue moister, but furred. Takes food readily: no sickness. Skin cool. Pulse 124. Breathing rapid.

25th.—Seemed improving up to yesterday morning. Since then he has talked a great deal, and talked during the greater part of the night. But towards the morning he became unconscious. He seems to have had a good deal of abdominal pain yesterday; and his bowels were relieved several times last night and this morning. He is now unconscious, breathing rapidly, and having much mucous accumulation in his throat. The eyes diverge. Lips dry. Pulse 136. Water to be drawn off regularly. Emp. lyttæ capiti.

26th.—Is said to have been rather more sensible since nine last night, but is now again almost entirely unconscious. He does not attempt to answer or to protrude his tongue. He moves his head and hands about a little, and his breathings (which are now not rapid) are attended with prolonged groans. The bowels have been relieved several times. Abdomen large and tympanitic. Lips dry and black. Pulse 124.

He remained in this state until 2.30 A.M. on the following morning, when he died quietly.

Autopsy.—There was an increase of the subarachnoid fluid. The arachnoid and pia mater were thickened along the margins of the longitudinal fissure and along the fissures of Sylvius. At the base of the brain, and all over the cerebellum, the subarachnoid tissue was occupied by soft gelatinous lymph. At the base also were numerous miliary tubercles. There was slight distension of the ventricles with serum. The substance of the brain was somewhat softened, but otherwise healthy. Vessels healthy.

Some old pleural adhesions were present. The lungs were congested and œdematous, and thickly studded with miliary tubercles. At the apices were several patches of commencing softening. A few small ulcers were found in the lower part of the ileum and in the cæcum. They were probably tubercular, but no tubercles were found. The liver was large and fatty. All other organs healthy.

XVII.

ON TUBERCLE OF THE CEREBELLUM.¹

THE following cases of cerebellar tubercle are few in number partly because I have excluded all such as were complicated by tubercular growths in other parts of the brain-substance, partly because I have not had time to collect my older experiences on the subject, and partly because I have not quoted any of the considerable number of cases which have been under my care in which I have had reason to suspect the presence of cerebellar tubercle, but which I have not had the opportunity of following to the end.

The first case is that of a bright little boy of 10, whose illness was of nine months' duration, three months of which time were passed under my immediate observation. He suffered at first from headache and sickness. After admission into the hospital the sickness ceased for a time and the most noticeable phenomena present were headache and optic neuritis. Soon his eyesight became impaired, and he was attacked from time to time with temporary blindness. The blindness soon became complete and permanent, and about this time the headache returned, and he often suffered (especially when the headache was upon him) from giddiness, with inability to stand. A few days before his death he had his first and only epileptic attack, in which he became livid and insensible, and his pulse sank to 30 in the minute. From this he recovered, but a few hours before death passed into a comatose state.

It is worthy of notice, that the patient's headache shifted, was generally referred to the forehead, and occasionally ex-

¹ *St. Thomas's Hospital Reports*, vol. xiv.

tended down the neck ; that he never presented any motor paralysis of any kind ; that (excepting when suffering from intense headache) he could always maintain his equilibrium and walk without difficulty, even after he became blind ; and that he retained his intelligence, brightness, and good humour throughout his illness.

A mass of tubercle as large as a chestnut was found in the posterior part of each lateral lobe of the cerebellum ; and the ventricles of the brain were distended with fluid.

The second case is that of a man 25 years of age, whose illness was also of about nine months' duration, and who was in the hospital about three months under my care. This man, like the little boy, suffered at first and for some months mainly from headache and sickness, and later also from giddiness. When he came into the hospital he was still complaining of headache and sickness, and he presented an internal squint of the right eye. But in other respects his eyes were healthy and his eyesight good. He had no other paralytic symptoms, and he could walk without staggering. About six weeks before his death optic neuritis first appeared. It increased rapidly, but never caused impairment of sight. For the last week of his life he complained more than he had previously done of headache and sickness. He was discovered comatose in his bed on the morning of his death, and died in the course of a quarter of an hour. He had been quite sensible less than an hour before.

In this case it may be specially pointed out that the headache was generally referred to the back of the head ; that there was paralysis of the right external rectus, and that occasionally when the headache was intense the patient complained of tingling throughout the left side ; that he suffered but little from giddiness while under my care, and for the most part was up during the day and able to walk about without difficulty ; and that the optic neuritis was of very late development. It may be added that the temperature, which was generally below the normal, was below it at the time of death.

In the posterior part of the right lobe of the cerebellum was an embedded tubercular mass as large as a pigeon's egg.

There were also the remains of tubercles in the lungs and bowels.

The third case is that of a boy of 16, who seems to have been ill for four months only, and was in the hospital for a month. He suffered at first from headache, sickness, and giddiness, and some impairment of sight.

He complained of severe pain at the top of the head and down the back of the neck, which latter was aggravated by bending the neck; he was frequently sick; he was giddy but could walk without staggering; the tongue was protruded to the right; and he had weakness of both internal recti with some uncertainty in moving the eyeballs, double optic neuritis, and much impairment of sight. There was slight evidence of nystagmus; and occasionally slight tremors of the arms attended voluntary movements. He was inclined to be drowsy, a phenomenon which increased upon him towards the end of life, at which time also he became blind, and passed his evacuations into the bed.

In this case, also, it will be noticed that there was little or no presence of staggering gait. The pain was referred to the top of the head and back of the neck. Optic neuritis and failure of sight showed themselves early. He had partial paralysis of both internal recti and of the right side of the tongue. He never had any fits, but was inclined to be drowsy, and at length became comatose.

At the autopsy it was discovered, that there was a little basal meningitis; that there were two tubercular masses in the cerebellum, one as large as a hazel-nut in the left hemisphere, and one ovoid and about two inches in diameter in the central lobe and involving the roof of the fourth ventricle; and that the ventricles were distended with fluid. The rest of the body was not examined.

The last case is a particularly interesting one, for it is that of a boy who had for two years had symptoms pointing to tumour of the cerebellum, but who came under my care for tubercular meningitis of recent development, of which he died.

The patient was eleven years of age. Two years before death he had had two fits; from which time he had 'been weak in his legs,' and for the last year unable to stand. His

'weakness' was described as being a tendency to stagger. He had also suffered from pain referred to the forehead and eyes. On admission his acute symptoms were of a few days' duration only; he was quite sensible, but he was unable to stand alone, in consequence of staggering like a drunken man. I need not describe the further progress of the case, which ran the ordinary course of tubercular meningitis, and proved fatal sixteen days after admission.

After death extensive tubercular meningitis was discovered; and, in addition, two masses of tubercle in the cerebellum: one the size of a hazel-nut in the right lobe, the other as large as a walnut, occupying the middle lobe and adjoining portion of the left lobe, and projecting from above into the fourth ventricle. There was much ventricular fluid. The lungs, liver, and spleen were studded with tubercles.

The most noteworthy facts in these cases are: 1st, the general prevalence of the common signs of intracranial tumours, namely, headache, sickness, and optic neuritis; 2nd, that the headache was by no means limited to the back of the head; 3rd, the almost complete absence of anything like a staggering gait, excepting in the last case, in which it had been of long duration and was typical; and 4th, the supervention also in the last case of tubercular meningitis, a complication of tubercular tumours of the brain which might be looked for, but is certainly not common. The local paralyses presented by one or two of the cases do not seem to have been significant.

CASE 1.—Tubercular tumours of cerebellum, and dropsy of ventricles; headache; vomiting; giddiness; optic neuritis; blindness; absence of cerebellar gait; finally epileptiform attacks, coma, and death.

William F., a schoolboy, 10 years of age, was admitted under my care on December 12, 1882.

Had been healthy up to six months before admission, when he began to suffer from headache and sickness. The headache was more or less paroxysmal, and the sickness came on two or three times a day. They had both increased of late, and latterly also his sight had failed somewhat. Never had fits.

He is a rosy-faced, plump, healthy-looking lad. He complains of pain in the frontal region, and has well-marked optic neuritis, but there are no other present signs of illness whatever. The pupils act normally; he can see, smell, taste, and hear well; and there is no paralysis of either sensory or motor nerves. He has no difficulty in walking or maintaining his equilibrium, and all the reflexes are normal. No affection of thoracic or abdominal viscera. Pulse, 92; temp. 98.4°; tongue clean; appetite good; bowels confined; sleeps well.

For the following seven weeks the patient's symptoms presented no material aggravation. He had a fair appetite, and had no recurrence of sickness. His headache came on at irregular intervals, for the most part every day, lasting for several hours at a time. During the attacks he generally had marked impairment of sight, and was now and then apparently blind; he generally seemed more or less torpid, and frequently moaned. Momentary blindness would also come on occasionally, even when he was free from pain. The headache was referred generally to the frontal region, but occasionally to the occiput, and on one or two occasions to the mastoid regions, which were then tender. Once or twice the pain extended down the neck. When he was free from pain he was always cheerful and lively, walked about and took an interest in all that was going on, and in fact, but for some impairment of sight and the optic neuritis, seemed quite well.

On February 6 it was noted that on the previous three days he had a series of curious attacks, in which momentary shudders passed over him at intervals of a few minutes for an hour or so at a time. On this day he had intense headache, and was sick for the first time since admission.

From this time to March 5 his condition on the whole was worse than it had been, but there was no material progressive aggravation of symptoms. He had become and remained absolutely blind; he was frequently sick; he complained much of giddiness, and at such times was unable to stand; his headache was now frequent and intense and, as before, variable in seat. When it was on him he sometimes seemed semi-comatose, and often cried out with pain. But his temperature never rose above the normal; his pupils were always dilated; there was never any sign of paralysis; he never passed his evacuations into the bed; and the pulse ranged from 72 to 120. And in the intervals between his attacks of pain he was still sensible and lively, enjoyed his food, and so far as his continued blindness allowed was able to get about the ward.

March 4.—After a restless night he had a fit this morning,

ushered in by a loud scream. In it his face became livid, his limbs rigid, and his head strongly retracted. The pulse at first was extremely feeble, and only 30 to the minute; later it rose to 60. The fit lasted about fifteen minutes, but was followed for some time by momentary attacks of rigidity. After the seizure he remained in much the same condition as he had been before it, until the 7th, when intense headache and constant vomiting came on, which, after about four and twenty hours, were succeeded by profound coma; in which condition he died, in the course of a few hours, on the following day.

It may be added that the pain was temporarily relieved on two or three occasions by the application of leeches or blisters behind the ears or to the temples.

Post-mortem Examination.—Membranes of brain healthy. Convolutions of cerebrum flattened. Surface of brain dry, and generally pale, but larger veins very full of blood. The lamina cinerea was tense, convex, and transparent; and the infundibulum, which was also transparent, formed a tense conical dome-like projection, with a ring-like thickening at its base in front, around which the optic tracts and commissure were stretched. These appearances were due to great distension of the third ventricle with fluid. Both lateral lobes of the cerebellum were adherent behind to the dura mater; and embedded in the corresponding part of each lobe, at about an inch and a quarter from the median line, was an irregularly rounded tubercular mass about as large as a chestnut. The left was rather the larger of the two. The general substance of the brain was quite healthy, but the lateral and third ventricles were very largely distended with limpid, colourless fluid. There were no miliary tubercles discovered in the membranes of the brain. The other parts of the body were not examined.

CASE 2.—*Tubercular tumour of cerebellum; headache; vomiting; giddiness; paralysis of right external rectus; optic neuritis; absence of cerebellar gait. Death from coma.*

B. W., a stationer, æt. 25, was admitted on August 7, 1880. He was single, had not been a drinker, had never had rheumatism or syphilis, and in fact had had fairly good health until about last Whitsuntide.

At that time he began to suffer from paroxysmal occipital headache and vomiting. The vomiting was always preceded by the headache, and relieved it. Thus he continued without much change until August 1, when he began to see double, especially distant objects. This has continued. He has also suffered much

from giddiness, especially when standing up. His gait, however, does not seem to have been markedly unsteady. There has been no loss of power in limbs, or anæsthesia, but he has sometimes had slight tingling on left side when the paroxysms of pain have been most severe.

On admission he looked pale and ill, but his body was fairly well nourished. He complained of pain at the back of the head, which had been constant during the last two months, but liable to frequent exacerbations, and of sickness, generally coming on several times a day, but chiefly in the morning before breakfast. He had double vision, associated with an internal squint of the right eye. No other paralysis or evidence of nervous disease.

Tongue clean, appetite fair, bowels confined, abdomen normal, no cough, and no distinct physical evidences of pulmonary disease; heart-sounds healthy; urine free from albumen, containing phosphates, sp. gr. 1024.

On the 16th his eyes were examined by Mr. Nettleship, who confirmed the fact that there was paresis of the right external rectus, and reported that there were no signs of optic neuritis. The pupils were equal, and acted to light.

There was no very marked change in his symptoms down to November 12 or 13. His headache was pretty constant, and at times intense. It was referred generally to the back of the head, but occasionally to the top. The vomiting varied; it occasionally left him for days together, but generally occurred once or twice daily, and had no obvious relation to the taking of food. Indeed, he generally had a fair appetite. He occasionally complained of tingling in the feet and on the left side when the pain was very intense. The squint continued, and perhaps became more marked, but there was no affection of any of the other ocular muscles; the sight continued fair, and the pupils acted perfectly. On October 9, double optic neuritis was for the first time observed, and on the 25th Mr. Nettleship noted that there were hæmorrhages in both retinæ. No paralytic phenomena had come on, no fits, no rigidity or tremors, no marked mental phenomena; nor did he at any time complain specially of giddiness. He had generally slept well. Further, he had never suffered from cough or diarrhœa. He had not been in the habit of keeping his bed.

From November 18 to 19 he had much more constant and severe vomiting than he had previously experienced. This ceased, however, on the 19th, on the evening of which day his headache became unusually intense, and he complained much of giddiness; and during the night he could not sleep, but was sitting up in bed, and frequently crying out with pain. In the morning the pain was still present, and instead of getting up as usual at 8 A.M. he

remained in bed. About 9 o'clock he asked the nurse to bring him some water to wash himself, saying that he meant to get up very soon. About a quarter before 10 the nurse noticed that his face was livid, and that he was insensible. There were no convulsions. A few minutes later the house physician arrived and found him comatose and motionless, with a scarcely perceptible pulse, and breathing at long intervals. The pulse soon became imperceptible, and he died in less than a quarter of an hour.

His temperature throughout his illness had varied from 96.2° to 98.6°. At the moment of death it was 96° in the axilla, and twenty minutes later 97.5° in the rectum.

Autopsy.—The body was in fair condition. The brain generally was fairly healthy, but projecting backwards and outwards from the hinder and outer part of the right lobe of the cerebellum was a hard, rounded tumour. This, which was about the size and shape of a pigeon's egg, was embedded in the substance of the cerebellum. It was opaque, yellow, firm, well-defined, but without any distinct capsule. It was evidently tubercular. No other tubercles were found. There was marked excess of subarachnoid fluid.

Both lungs presented, especially in their apices, much evidence of old tubercular disease, but there were no cavities, and no tubercles of recent formation. Pleuræ adherent above. There were several, apparently tubercular, ulcers in the lower part of the small intestine. They were mostly in process of cicatrisation. Nothing else noteworthy was discovered.

CASE 3.—*Tubercular tumour of cerebellum; effusion into the ventricles; headache; sickness; giddiness; optic neuritis; impairment of sight; paralysis of both internal recti and of right side of tongue; no fits; absence of staggering; coma. Death.*

Daniel L., a labourer, æt. 16, was admitted under my care on November 29, 1882.

The history obtained concerning his illness was somewhat vague and contradictory. It seemed, however, that he had been ailing for about two months with headache, giddiness, sickness, and impairment of sight. He had occasionally seen double; his bowels had been constipated.

The patient is a spare, heavy-looking boy. He complains of pain at the top of the head and in the back of the neck, of constant sickness, and of failure of sight. He suffers also from giddiness, but he can walk without staggering. There is no paralysis of the limbs or impairment of sensation, neither is there any paralysis of

the facial muscles; but he protrudes his tongue to the right, and there is apparently some weakness in both internal recti and a little uncertainty in the movements of the eyes. Moreover, when he attempts to turn his eyes far in any direction there is a slow oscillating movement, resembling, but much slower than, true nystagmus. The pupils are equal, dilated, and act freely to light. His eyesight is very defective and he cannot distinguish even large letters. No affection of the other organs of special sense. He holds his head rigidly, and complains of some pain when he endeavours to bend his head forwards. Tendon reflexes normal. Slight tache cérébrale. Abdomen retracted; no signs of disease in chest or abdomen; urine normal; pulse 78.

The patient's symptoms remained much as they are above described for two or three weeks. He continued to complain more or less of pain at the back of the head; he was often sick; the paralysis of the right side of the tongue and of both internal recti continued; but no other paralysis supervened. His pupils remained dilated and equal, and active to light; and the sight was always extremely defective. He had not distinct colour-blindness, but he had difficulty in recognising the forms of even large objects, and occasionally for a time he said that he was, and he appeared to be, quite blind. Ophthalmoscopic examination of the eyes showed well-marked double optic neuritis. His temperature remained normal, and his pulse, which varied between 60 and 96, was generally about 60 and somewhat irregular. He was often drowsy and inclined to be fretful, and occasionally was irritable and called out at night. On one or two occasions muscular tremors, attending voluntary movements, were observed.

Toward the end of December, his vomiting became more frequent, and he grew rapidly weaker; he got very drowsy and difficult to rouse, and at times noisy; he passed his evacuations into the bed; his blindness became, so far as we could make out, absolute, and his pupils insensible to light. The pulse got quicker, though never very quick, and his temperature rose occasionally to 100° and upwards. He died comatose on January 1.

Autopsy.—Calvaria and dura mater healthy. There was some flattening of the convolutions, and a trace of basal meningitis. The lateral ventricles were largely distended with fluid, and the infundibulum formed a tense cone at the base. The substance of the cerebrum was healthy.

At the posterior margin of the left hemisphere of the cerebellum partly embedded in its substance, was a tumour the size of a hazelnut. This was soft, grey, and contained some effused blood. In the

central lobe of the cerebellum, and extending thence into the lateral lobes, was an ovoid tumour, of the same kind as the last, about two inches in diameter. This involved the roof of the fourth ventricle, but did not reach the upper surface of the cerebellum. Corpora quadrigemina, optic thalami, corpora striata, and the nerves at the base were all healthy. The tumours were, I believe, tubercular, but, unfortunately, no record of their nature has been preserved. The rest of the body was not examined.

CASE 4.—*Tubercle of cerebellum, followed by tubercular meningitis: pain in head, with loss of power of walking of two years' duration, followed by symptoms of tubercular meningitis, and death.*

Henry W., æt. 11, was admitted under my care on June 6, 1878. Two years ago he had two fits, in which he remained insensible for about twenty minutes. He has been 'weak on his legs' ever since, and for the last twelve months quite unable to stand. This inability, however, has depended, not so much on weakness of the legs, as on a tendency to stagger. He has had more or less constant pain in the forehead and eyes the whole of the time. During the last few days he has manifestly been getting worse, and he has rambled a little at night.

On admission the boy seemed to be quite sensible, but he complained of severe frontal headache and of tenderness in the cervical spine. He had no power of standing alone, but tumbled about as if he was very drunk. There was no paralysis; his pupils were dilated and equal; his sight and hearing good. Tongue coated; no sickness; evacuations passed naturally. Chest resonant, breath-sounds healthy. Cardiac sounds and action normal. Pulse 124, temperature 102·3°.

9th.—Has rapidly been getting worse. Has been sleeping off and on by snatches, but at times has been very talkative, and has continued talking for hours together, harping for the most part on certain words and phrases which he utters loudly at short intervals. He was talking at the time of my visit: 'Will it be like that, sir?' 'Thank you for that;' 'Oh would it, please?' 'Oh yes, please;' 'Oh yes, sir, will you?' 'My head, it will like that;' 'My head like that;' 'My head was like that, please;' 'My head will like that, please;' 'Oh yes, please, would you?' and again, 'My pretty eye;' 'My pretty head;' 'My poor head,' &c. He seemed sensible when roused and answered correctly, but ran off into disjointed sentences. He complained of headache and pain in the neck. The left upper eyelid drooped a little, but he could elevate it with

an effort; there was no paralysis whatever of the ocular muscles. The left pupil was more contracted than the right. Vision perfect, but some photophobia. No paralysis of limbs; no sickness; no convulsions; evacuations passed unconsciously. Pulse very variable; it was 84 in the minute when I first came to his bedside; but it rose in a few minutes to 120. The temperature has varied since admission from 99.5° to 102° .

11th.—Has been alternately drowsy and noisy, sometimes shrieking out; is now very restless, constantly rolling his head and tossing his arms about. Says he has no pain. He is certainly less sensible and articulate than he was. The eyes seem unduly prominent, and the right pupil is dilated and sluggish; double optic neuritis. No sickness, no paralysis, no convulsions. Evacuations still passed naturally. Pulse 80, temperature varying from 99° to 100.7° .

On the 14th it was noted that his general condition had undergone little change. His right pupil was still sluggish, and he had now a slight squint. His eyes were prominent, his eyelids congested, and his frontal veins extremely distinct. Constantly moaning and calling out, and rambling in speech. Temperature has varied from 98.6° to 100.2° ; pulse from 88 to 100.

On the 15th he first passed his evacuations into the bed. On the 16th it was determined that there was manifest loss of power in the left external rectus, and that his eyes moved at times independently of one another. His pulse had risen to 132. On the 17th he was becoming more drowsy, though still restless and noisy at night, and still understanding if addressed loudly. His pupils were dilated and inactive to light, but it was thought that he could still see. He was constantly moving his hands about and seemingly picking at, or playing with, imaginary objects. Pulse 144.

On the 18th it was observed that his left side was weak; at any rate he moved the left arm and leg much less than their fellows. The pulse was still 144. During the last four days his temperature has usually been between 99° and 100° , but once or twice has reached 101° .

21st.—Much worse. Has continued restless and noisy at night, but now seems quite unconscious to external impressions. He lies on his face with his head inclined to the left, and constantly moving his right hand as if fingering something. The left arm is kept quiet, but he can move it. Right pupil contracted, left dilated but immovable; paralysis of left external rectus. Congestion of conjunctivæ, mainly of right; optic neuritis also most marked on this side. Apparently quite blind. Tongue coated; skin dry;

pulse 192. The temperature, which was 101° in the morning, rose to 103.7° in the evening.

During the 22nd he was gradually sinking. His pulse was 180; his temperature 101.5° in the morning, and 104.5° in the evening. At 3 A.M. on the 23rd he was attacked with hiccough, which was shortly afterwards followed by vomiting, and he died in the course of two or three hours.

It is noteworthy that the patient never had any sickness until he was moribund, and that he never had any convulsions.

Autopsy.—On opening head, dura mater very tense, and convolutions flattened. Meningitis at base of brain; pons Varolii, optic commissure, and neighbouring parts covered with tough yellow lymph and miliary tubercles. Pia mater of both Sylvian fissures covered with tubercles, as also the velum interpositum and the surface of the middle lobe of the cerebellum. At posterior border of right cerebellar lobe, and adherent to the dura mater, was a mass of yellow tubercle about as large as a hazel-nut. A much larger mass, about as large as a walnut, but of irregular shape, occupied the middle lobe and commissural portion, extending, however, farther to the left than the right. It projected from the roof of the fourth ventricle, and by pressing on its floor almost obliterated the cavity. These masses were generally firm, but soft and friable in the centre, and surrounded by a kind of vascular capsule. The lateral ventricles were much distended with fluid. Fornix and septum lucidum softened. Lungs studded with groups of miliary tubercles. Bronchial glands enlarged, caseous, putty-like, and calcareous. Small yellow tubercles were found in the liver and spleen. All other organs healthy.

XVIII.

ON UNRECOGNISED OR MASKED CEREBRAL
TUBERCULOSIS.¹

IN looking through the fatal cases that have been under my care during the last two or three years, I found that they included a considerable number in which tubercles were found either in the brain or in the cerebral meninges, or in both. In this, of course, there is nothing very remarkable; for cases of cerebral tubercle are unfortunately very common, and they gravitate largely to hospitals. But I observed also that there were several among them in which the presence of tubercles in the brain or its membranes was concealed, or rendered doubtful, during life, in consequence of the association therewith of other diseases which seemed adequate to explain the patients' symptoms; and one or two in which the apparent cause of cerebral symptoms might have been taken to exclude the possibility of their dependence on tuberculosis. It is to these cases that I wish to call attention on this occasion; because, while several of them have clinical or pathological features of special interest, they all seem linked together by the common clinical difficulty which the name that heads my paper is intended to express.

The first two cases I shall quote are cases of children who, supposed to be perfectly healthy at the time, received blows on the head, which were immediately, or almost immediately, followed by cerebral symptoms leading to death at the end of about three weeks.

¹ Read before the South London District of the Metropolitan Counties Branch, February 1884.—*British Medical Journal*, April 1884.

CASE 1.—*Tubercular meningitis ; symptoms following immediately on a blow on the head. Death. Necropsy.*

A boy aged 10, a pupil at a Board school, was said to have had perfectly good health up to May 30, 1879. On that day his schoolmaster boxed his ears two or three times ; and shortly afterwards he complained of headache, was sick, and went home. From that time until June 17, he suffered more or less constant pain in the back of the head and neck ; he was frequently sick ; there was a marked tendency to constipation ; and he lost flesh and strength. His pulse was observed to be slow, and his tongue clean. He had no fit. On the 17th he passed into a state of partial coma.

On the next day, the 18th, I saw him with his medical attendant. He lay in bed, taking no notice of what was going on round about him ; his respirations were for the most part attended with groaning ; and occasionally he uttered some stereotyped phrase. When addressed loudly he opened his eyes, but made no answer and took no further notice. His pupils were unequal but there was no obvious squint, nor, indeed, any other definite paralytic symptoms ; the conjunctivæ were congested. He had passed his evacuations into the bed since the previous day. There was no sign of thoracic or abdominal disease, no rash, no ear-affection, no sign of injury to the head. The tongue was coated. His coma gradually became more profound ; and he died, without any important change of symptoms, on the afternoon of the 21st.

The post-mortem examination (at which I was present) was made on the 22nd. The body was emaciated. On removal of the skull-cap, the surface of the brain was found flattened and dry, and the pia mater uniformly and much congested. There was slight inflammatory thickening along the intergyral spaces and large vessels. A good deal of inflammatory deposit occupied the confluxes at the base of the brain ; and numerous small but distinct tubercles were scattered over the medulla oblongata and pons Varolii, about the circle of Willis, and along the fissures of Sylvius. There was great excess of fluid in the lateral ventricles, with much congestion and thickening of the velum interpositum and choroid plexuses, and abundance of tubercles in the velum. The brain-substance was fairly healthy. There was no evidence of injury to the bones of the skull or to the soft parts within. The lungs, pleuræ, heart, and pericardium were free from tubercles, and healthy. The abdominal organs were not examined.

CASE 2.—*Tubercular meningitis; symptoms coming on after a blow.*
Death. Necropsy.

J. A. B., a boy two-and-a-half years old, was admitted under my care on April 8, 1882. He had had good health up to the present illness, with the exception that, about a year previously, he had had two convulsive fits, attributed to teething. On March 21 he accidentally fell downstairs, cried, and said he had hurt his head; but he soon recovered, and continued well until the 24th, on which day he refused his food. In the night he was sick. The next day he ran about; but he was feverish and fretful, and still refused his food. He continued in much the same state for the next fortnight, suffering especially from loss of appetite, sickness, and constipation. On the 31st, he took to his bed; and from that time till his admission he passed his evacuations involuntarily. On April 7, he had a fit, attended with loss of consciousness, distortion and lividity of face, and convulsive movements of the hands. He remained unconscious.

He appeared to be a well-developed, well-nourished child. He was almost wholly unconscious; took no notice when spoken to; but withdrew his limbs when they were pinched or pricked. He generally lay on his back, but occasionally placed himself on his side. He presented occasional slight convulsive movements, which were also induced whenever he was moved or the attempt was made to feed him. The limbs tended also to become rigid at these times. The face was flushed. The eyes were opened occasionally, but usually kept closed; there was no squint; the pupils were equal, of medium size, insensible to light. Respiration presented the Cheyne-Stokes character in a well-marked form. The tache cérébrale was fairly well developed. Reflex phenomena were natural. The thoracic and abdominal viscera were apparently all healthy. There was no albumen in the urine. The temperature in the morning was 99.2° , but it rose in the course of the day to 101.8° .

During the 9th he still remained unconscious, and had several fits. The temperature varied from 102.8° in the morning to 100.1° in the evening. No paralyses. The optic discs and retinae were healthy.

On the 10th he still remained unconscious; and, excepting that his temperature gradually fell from 101.2° in the morning to 97.4° in the evening, his condition underwent no material change up to the time of his death, a little after 7 P.M.

Necropsy.—The convolutions of the brain were flattened, and

the surface dry. There was a little recent lymph in the subarachnoid tissue at the base ; and numerous grey tubercles existed about the fissures of Sylvius, crura cerebri, and pons Varolii. The brain-substance generally was healthy, and was free from tubercular deposits. The ventricles were distended with serous fluid, and the white matter around them was softened. There was an encapsuled calcareous mass in the apex of the left lung, and a few miliary tubercles in its neighbourhood. Miliary tubercles were also found in the liver and spleen. All the other organs were healthy.

REMARKS.—The above cases were, apart from their apparent causes, mere ordinary cases of tubercular meningitis, and would naturally, by most medical men, have been regarded as such during life. That also was the view which I took of them. At the same time, they were attended with some obscurity, and there were some grounds for entertaining an opposite opinion with regard to them ; and I looked, therefore, with more anxious interest than I usually do to the revelations of the post-mortem room. In both of them, and especially in the first, the symptoms followed so immediately on the blow, that it was difficult not to believe that the cerebral mischief was due to the blow ; in neither of them was there any clinical evidence whatever of abdominal or thoracic tuberculosis ; in neither of them was there any paralysis of the ocular or other cerebral nerves, which is common in inflammations at the base of the brain ; and in the only one examined ophthalmoscopically the optic discs were healthy ; but, on the other hand, there were no signs whatever of disease of the ear, or any evidence of damage to the skull. The post-mortem examination in each case revealed, as was anticipated, the presence of tubercular meningitis ; but it showed also that the tubercles were few in number and small in size, and that the tubercular affection was therefore in an early stage. There is no sufficient reason, of course, to suppose that the tubercular deposit was caused by, or even supervened on, the blows upon the head. Doubtless the natural course of events in each case was, first, the deposition of tubercles, unattended with marked symptoms or obvious deterioration of health ; and second, the supervention of inflammation and dropsy excited by the local injury, to which, and not to the tubercular deposit immediately, the

patient's symptoms and death were due. There is no reason, so far as I know, to doubt that, in all cases of cerebral tuberculosis, the early stage of tubercular deposition is unattended with symptoms, and that it is only at a later period, when the tubercles either have attained considerable bulk, or have implicated specially important parts, or have become associated with inflammatory mischief, that such cases become recognised clinically as cases of cerebral tumour or tubercular meningitis as the case may be. Both of the cases I have narrated, and more particularly the first of them, convey an important warning to schoolmasters and others who have to do with children and are in the habit of chastising them. There are parts of the body which seem made for corporal punishment, and on which it may be inflicted to any reasonable extent without injury. They should confine their attention to these. I need scarcely add that the danger of serious mischief from comparatively slight blows on the head is not limited to those who are the subjects of latent tubercles. Rupture of the membrana tympani is not unfrequently caused by boxing the ears; and I recollect very well, some few years ago, being called to the death-bed of a young man who was dying from abscess of the brain connected with ear-disease. The history was that he had had deafness and discharge from one of his ears for some years, but that he had never had any severe suffering therefrom, and was in fact in good health until (about a week before his death) he was knocked down by a blow of the fist inflicted straight upon his lower jaw. This was immediately followed by intense pain and other symptoms referrible to the ear, and, within a day or two, by those of fatal cerebral disease.

The next two cases are instances of disease of the internal ear, in both of which cerebral tuberculosis was discovered after death, but in neither of which (I am bound to confess) did I suspect the presence of this complication during life; in the first, because, as a matter of fact, there were no symptoms to justify any such diagnosis; in the second, because, although the child's symptoms were exactly such as might be caused by tubercular meningitis, I was misled by the history and presence of ear-disease into attributing them to brain-mischief secondary to this affection.

CASE 3.—*Caries of temporal bone; facial palsy; tubercular tumour in brain; pulmonary tuberculosis. Death, apparently from exhaustion. Necropsy.*

Mary C., aged 2½, came under my care on May 31, 1883. She had had measles and whooping-cough, and for a year had suffered from a discharge from the left ear. Three days before admission, without obvious cause, her face had become drawn to the right. She had not suffered specially from earache; and she had had neither headache, drowsiness, squinting, nor vomiting.

On admission, she was pale, but not emaciated. She had an offensive discharge from the left ear, and complete paralysis of the left portio dura; but there was no other paralysis; and, excepting that the child had a slight cough and a little occasional coarse crepitation over both lungs, she seemed healthy.

She gradually became weaker; but there was very little further change in the child's condition during the month she was in the hospital. The ear continued to discharge profusely, but she had very little pain in it, and no swelling or tenderness in the neighbouring parts. The facial palsy remained unchanged. She was inclined to be drowsy, but was not irritable, was perfectly sensible and never had convulsions or any paralysis save that of the portio dura. She had no sickness; took her food fairly well, excepting towards the last; and her bowels were regular. Her pulse and respirations were rapid; and her temperature presented remarkable variations; in the morning, it was always subnormal, ranging usually from 95° to 97°; in the evening, it was almost always between 102° and 103·8°. On two or three occasions the evening temperature varied from 99° to 101°. Her cough, though not very troublesome, continued to the last. The tache cérébrale was always producible. The ear was examined on two or three occasions; but the discharge was so profuse that no clear view of the bottom of the meatus could be obtained. During the last few days, she became very weak and very drowsy, and, without any special symptoms, died, apparently from exhaustion, on the morning of June 30.

Necropsy.—The body was much emaciated. The dura mater was firmly adherent to the skull, especially in each temporal region. That over the left temporal bone was a little thickened; and there was a slight amount of inflammatory lymph between it and the bone in this situation. The convolutions were flattened. There was no congestion or inflammation of the pia mater, and no appearance of miliary tubercles. The substance of the brain was

soft, and the lateral ventricles contained a large quantity of serous fluid. In the right superior parietal lobule was a caseous tubercular mass as large as a small walnut; this was embedded in the brain-substance, and extended almost to the outer edge of the lateral ventricle. Two similar masses, each of the size of a pea, were found in the left occipital lobe, at its extreme posterior edge. The left temporal bone, at the junction of the squamous and petrous portions, was superficially carious, granular, and presented pinhole perforations. The external surface of the temporal bone, adjacent to the attachment of the pinna, was in a similar condition. The external meatus was completely bare and carious. The aqueductus Fallopii was involved in the carious and necrosed bone, and the facial nerve was destroyed. There were no traces of the auditory ossicles. The carotid canal and jugular fossa were not affected. The lungs were adherent by old adhesions, and thickly studded with caseous masses. In the apices were many small cavities. The bronchial and mesenteric glands were enlarged and caseous. The remaining organs were generally healthy.

CASE 4.—*Tubercular meningitis associated with chronic otorrhœa; psoas abscess; convulsions; coma; paralysis of both external recti and of superior rectus and levator palpebræ of right side.*

Rosina C., aged 9, was admitted under my care on April 9, 1883. When two-and-a-half years old, she fell and injured her spine, and subsequently presented a bend in the lumbar region. Three years before admission, she had scarlet fever, since which time she had been deaf, and had had a discharge from her right ear. Two weeks before admission, 'an abscess broke' in this ear, and there was an offensive discharge from it up to the 6th. The patient was frequently sick from the commencement of her illness up to the same date; but she continued to run about and play as usual. On the evening of the 7th, she had an epileptiform fit; and on the 9th she had a second. The convulsions affected both arms and both legs equally.

The child, on admission, was fairly healthy-looking. She was drowsy, but very irritable, and frequently uttered the 'hydrocephalic cry.' There was no paralysis of the limbs, and no squint. The pupils were dilated, the right most so; and they acted little, if at all, to light. The tongue was coated. There was no vomiting. She had retention of urine. Temperature 102.2°.

April 10.—She was in much the same state, drowsy, irritable.

and complaining of headache. There was no paralysis of the limbs; but both external recti now acted imperfectly, as also did the right superior rectus and levator palpebræ. Both pupils were dilated, but the right was the larger. The tache cérébrale was well-marked. The hydrocephalic cry was frequent. The tongue was coated; there was no sickness; the bowels were confined. The urine was retained and had to be drawn off by the catheter. There was no affection of the chest. On examination of the right ear, perforation of the membrana tympani was discovered, but no discharge. It was assumed, however, that the child was suffering from cerebral complication of ear-disease, and six leeches were applied to the mastoid process. The temperature varied from 102.2° in the morning to 100° in the evening.

April 11.—The child gradually became comatose, with stertorous breathing, very feeble pulse, coldness of limbs, and falling temperature. When death occurred, in the course of the morning, the temperature was a little below the normal.

Post-mortem Examination.—The dura mater and skull were healthy. The surface of the brain was flattened, and somewhat dry, and the pia mater was a little congested. The membranes covering the medulla oblongata, pons Varolii, crura cerebri, and parts between these and the lamina cinerea were thickened, rough, and studded with a small number of minute grey tubercles. The surfaces of the fissures of Sylvius were adherent, and also presented a few small tubercles. The presence of these bodies was confirmed by microscopic examination. There was very little fluid in the ventricles, which were not at all distended. The substance of the brain was wet, but otherwise healthy. The fornix was somewhat softened. The vessels at the base were healthy. The sinuses were all healthy. The affection of the ear had not extended to the surface of the petrous bone, and there was no disease whatever in the dura mater covering it. The only other morbid conditions discovered were some caries of the lumbar vertebræ, and a double psoas abscess. But although the spine was bent, there was no disease of the bony surfaces immediately surrounding the spinal canal, no inflammatory products in the canal, and no affection of the spinal cord or nerves. There were no tubercles in the lungs or elsewhere.

REMARKS.—In the first of the cases just narrated the child was suffering from advanced ear-disease, which had implicated the aqueductus Fallopii, and destroyed the trunk of the portio

dura, and had involved the dura mater in the neighbourhood of the petrous bone. But, although there were tubercular masses of some size embedded in the substance of the brain, they had caused no symptoms whatever; there was no meningitis, and death was due mainly, if not exclusively, to exhaustion, referrible in part to the profuse discharge of pus from the ear, in part to pulmonary tuberculosis. In the second case, the child's latter symptoms and death were doubtless attributable to tubercular meningitis. It is noticeable, however, that the tubercles were few and small, and the meningeal inflammation slight; but that, excepting for vague prodromal symptoms, lasting about two weeks, the progress of the case was unusually rapid, extending only to about five days.

The last case to which I propose calling your attention is one which naturally falls into the same category as the two which have just been discussed; but, altogether, it was a case of much greater interest than either of these, and deserves individual consideration. It was that of a little girl who, two or three months before she came under my care, showed signs of paraplegia, without definite local signs of spinal disease; who, a week or two before I saw her first, had some protrusion of the left eyeball, and fulness in the corresponding temporal region; who suffered (during the twenty weeks she was under my care) from incomplete and somewhat varying paraplegia, presumably due to vertebral caries, from exophthalmos on the left side, with swelling in the left temporal region, and (later) discharge from the left ear, manifestly dependent on disease of the bones forming the wall of the orbit, and in the neighbourhood of this part; and who, a week or two before her death, manifested signs of cerebral mischief, of which (in combination with gradual exhaustion) she died.

In this case, caries of the vertebræ and of certain of the bones of the skull was discovered *post mortem*, as had been expected. There was also some inflammation of the portion of the brain in relation with the carious bone; but, further, there were miliary tubercles (scarcely tubercular meningitis) in the usual situation at the base of the brain. Their presence had not been suspected, and probably had had no influence on the

patient's symptoms, or the event of the case. I may call attention to a practical point illustrated by both the fourth and fifth of my cases ; to wit, that while both presented vertebral caries with pretty abundant suppuration, associated in one case with angular curvature, and in the other with paraplegia, neither of the patients presented the slightest pain or tenderness in the back.

CASE 5.—Caries of sphenoid bone with protrusion of eyeball ; softening of brain and meningeal tubercles ; caries of dorsal vertebræ and paralysis. Death. Necropsy.

E. M., a little girl aged 7, was received into one of my beds on March 17, 1880. The father had had syphilis followed by eruptions, and had latterly been suffering from progressive muscular atrophy. One brother had had a blow on the head, followed by the separation of a sequestrum, and had died of psoas abscess ; and a sister, after an injury to the wrist, had had an abscess in her forearm, followed by the discharge of a necrosed portion of the ulna.

The child was well until last Christmas, when she became dull and spiritless and inclined to mope. During January she began to complain of pain in her legs, but at first had no difficulty in walking. About the same time she seemed to suffer from general tenderness, and would scream when she was lifted up. Before long it was noticed that her legs were weak, and that also she had difficulty in sitting up. About three weeks before admission, the paralysis of the legs had become complete ; and then, or a little later, the left eye was observed to protrude. Subsequently a swelling made its appearance on the left temple.

She was a spare, delicate-looking, sensible child. There was marked exophthalmos of the left eye, but she could close the lid. There was no impairment of the motion of the eye, and no inflammation. The pupils were equal and acted to light ; the optic discs were healthy. In the left temporal region just outside the orbit, was a doughy, obscurely fluctuating, ill-defined swelling. There was no paralysis of the jaw, tongue, or arms. The legs were completely paralysed, but sensation remained perfect. The superficial and deep reflexes were increased. Ankle-clonus was readily developed, and the legs were apt to become stiff and to present paroxysms of trembling. The evacuations were passed involuntarily. There was no curvature and no tenderness at any part of the spine ; no bed-sores ; no disease of thoracic or abdominal organs. Pulse, 96 ;

respirations, 24 ; the urine was of specific gravity 1025, phosphatic, without albumen.

There was very little change in her condition during the next three or four months. She did not lose feeling in her legs, nor did she recover power over them, and all the phenomena of spastic paralysis remained well-marked, possibly even became somewhat increased. She occasionally acquired power over her evacuations, lasting even for several days at a time ; but for the most part, especially latterly, her evacuations escaped involuntarily. She improved a little in health and spirits, and at no time complained of pain or tenderness in the course of the spine. The prominence of the left eye varied a little from time to time, and once a patch of congestion appeared on the outer and upper part of the conjunctiva. The swelling in the temporal region increased a little, and became somewhat more diffused.

On July 4, I noted that there had been slight œdema of the left eyelids for a week or two ; and that now the œdema of the upper eyelid had much increased, and was attended with congestion ; that a circumscribed swelling, with an indistinct sense of fluctuation (as though an abscess were presenting), could be felt in the upper and outer part of the upper eyelid ; that the eye was a little less prominent than it had been, and slightly displaced downwards and inwards ; and that there was still no pain in the parts.

On the 12th, some purulent discharge escaped for the first time from the left ear ; there was, however, no ear-ache or deafness. The temporal swelling was somewhat smaller. The protrusion of the eyeball had increased, and the swelling in its vicinity was larger, redder, and more distinctly fluctuating. A day or two afterwards the swelling was punctured, with a fine trocar and cannula, but no fluid escaped.

On the 20th, I remarked that the swelling above the eye had become larger, but that the eye was somewhat less prominent ; that pus had continued to escape from the left ear, and that the temporal swelling had almost disappeared ; and that the child had for some days been able to move its legs freely, but that they were liable to become rigid and to tremble convulsively.

About this time, however, the child's temperature began to rise, attaining on one occasion an elevation of 103.4° ; her appetite fell off ; she complained at first of nausea, and soon was sick after everything she took, and rapidly lost flesh and strength. She still had no pain or tenderness in the back, and still retained the power of moving her legs voluntarily. She was now fed with nutrient enemata.

July 30.—She had a very restless night, calling and crying out constantly. She was apparently sensible, but spoke very indistinctly. Her pupils were dilated, equal. There was no paralysis of the face or arms. She had no discharge from the ear this morning. The swelling above the eye fluctuated. Temperature normal.

July 31.—She had slept well and had not cried out all night. She had taken no food by mouth, and had been sick only once after medicine. She was drowsy. She put out her tongue when told; it was thickly furred. The left pupil was larger than the right. She had no pain in the head. Temperature normal. In the evening she was about the same. Pulse, 108; respirations, 24; temperature, subnormal. There was no pain in head, and no sickness or discharge from the ear; no facial or ocular paralysis, but the tongue deviated distinctly to the left.

August 1.—She was much weaker. Her tongue was dry, protruded to the left. The pupils were equal. Pulse 108; respirations 36, attended with much rattling in the throat. Some hours later (at 1.30 P.M.) she had not spoken, but seemed sensible. The left pupil was more dilated than the right, and was unaffected by light. The tongue deviated distinctly to the left. The swelling above the eye fluctuated. There was no sickness, no fits. She waved her arms about, and picked at her nose; and had occasional twitchings of the muscles of the shoulders and back. The *tache cérébrale* was readily obtained. Pulse 120; respirations 30, attended with rattling in the throat. There was no sickness, or discharge from the ear. She died shortly afterwards.

Post-mortem Examination.—The body was much emaciated. The left eyeball projected. There was ecchymosis of the corresponding upper eyelid. The left temporo-sphenoidal lobe of the brain was firmly adherent to the greater wing of the sphenoid bone and to the posterior border of the lesser wing. The arachnoid at the base of the brain was a good deal thickened, and of an opaque yellow colour. Surrounding the vessels of the base, and especially along the fissures of Sylvius and connected with the duplicatures of pia mater in the adjoining sulci, were numerous minute grey tubercles. There was great increase of subarachnoid fluid, but in all other respects the membranes were healthy. The ventricles were slightly distended with fluid. The substance of the left temporo-sphenoidal lobe was considerably softened, and readily broken down by a stream of water. But there was no abscess; and the brain-substance, with this exception, was healthy. The nerves at the base were apparently healthy. In the left orbit, the upper and

outer osseous boundary (including the orbital plate of the frontal, the greater wing of the sphenoid, and the orbital portion of the malar bone) was partly stripped of periosteum, carious, and bathed in a considerable accumulation of thick matter. There was also a collection of cheesy pus under the left temporal muscle, connected with denudation and caries of the portion of the sphenoid here situated. The bodies of the third, fourth, and fifth dorsal vertebræ were largely destroyed by caries; the pedicles of the same vertebræ were carious and brittle; and the laminæ of the third and fourth were also involved. The bodies of the vertebræ were comprised in an abscess, extending from the second to the sixth vertebra, occupying the posterior mediastinum, but not affecting in any degree the adjoining pericardium and pleuræ. The affected portions of the vertebræ bounding the spinal canal were also bathed in pus, which was chiefly accumulated in front between the bodies of the vertebræ and the dura mater of the spinal cord. The anterior and posterior common ligaments were partly destroyed. The accumulation had evidently caused some pressure on the spinal cord. The dura mater was adherent at one point to the vertebræ; but the membranes were in the main healthy. The portion of cord corresponding to the diseased vertebræ was very pulpy. The rest of the cord appeared healthy. There was a little early inflammation at the base of the right lung; but no tubercles were discovered in the lungs or any other organ. The remaining thoracic and abdominal viscera, including the kidneys and bladder, were healthy. No disease of the temporal bone was discovered; nor was the communication (which doubtless existed) between the abscess under the temporal muscle and the external auditory meatus traced.

REMARKS.—The facts which one or two of my cases seem to illustrate, and which I could have illustrated more fully had that been my sole, or even main, object—namely, that there is a period in the early progress of cerebral tuberculosis in which the presence of cerebral mischief is not revealed by symptoms; and that the symptoms which attend the presence of meningeal tubercles are, for the most part, due less to the tubercles themselves than to the inflammation which sooner or later accompanies them—suggest a question of no little importance, which I should have liked to discuss had I not already taken up fully as much of your time as, on the present occasion, I have any claim to do. The question is whether the progress

of cerebral tuberculosis, like that of pulmonary tuberculosis, admits of being arrested ; and whether, too, the cure of tubercular meningitis—that is, of tubercle with its inflammatory complication—is within the range of practical therapeutics. The first half of the question is, of course, exceedingly difficult to solve. It may be observed however, in reference to it, that tubercular tumours are, judging from their clinical history, often very chronic in their progress, extending, it may be, over several years ; and that occasionally the membranes of the brain seem, judging from post-mortem examination, to be the only part of the body affected with tubercle. Both of these are facts suggesting a hopeful reply to the latter half of the question. I may say for myself that I have, on several occasions, had patients under my care, or have seen them in consultation, in whom the history and symptoms rendered it almost certain that they were suffering from tubercular meningitis, but in whom recovery took place. That the patients recovered from meningitis of the base was certain ; but whether from meningitis the consequence or accompaniment of tubercle, I have never (fortunately or unfortunately, according to the point of view from which one regards it) had the opportunity of placing beyond doubt. At any rate, the belief that we may, even though very rarely, check the progress of cerebral tubercle, and cure the inflammation of tubercular meningitis, is calculated to encourage us in our dealings with such cases, and to justify us in persisting in reasonable treatment, and in hoping against hope.

XIX.

*CASES OF TUMOUR OF THE CORPUS
CALLOSUM.¹*

Tumours of the corpus callosum, so far as I know, are rare. But it has happened to me within the last three or four years to have under my care three cases of primary tumour of this organ, and another case in which it became involved in a growth springing from the floor of one of the lateral ventricles. Consequently it has seemed to me worth while to collect these cases, and to consider how far, if at all, the symptoms presented by them were distinctive.

The first case was that of a middle-aged man, who first complained of headache about fourteen weeks before his death. Shortly afterwards his right arm, and subsequently his leg, got weak; and his intelligence became impaired. The symptoms slowly increased upon him, the paralysis of the arm and leg became aggravated; indications of feebleness in the facial muscles appeared; he became apparently more and more stupid and extremely drowsy, and probably to a large extent on this account he ceased to speak, and allowed food to collect and lie in his mouth. Before death he passed into a state of complete coma. There were no fits, no actual sickness, and no affection of the ocular muscles. The chief phenomena, in fact, were headache, stupidity, and drowsiness, in association with paralysis of the arm and leg of one side, and doubtful paresis of the facial muscles of one or both sides, the symptoms being slowly progressive.

At the post-mortem examination a spongy, probably sarcomatous, growth was found to involve the corpus callosum, mainly in its anterior part, and to extend thence on either side

¹ *Brain*, October 1884 (with additional case).

into the centrum ovale, the left side being chiefly affected. There was no disease of the grey matter of the convolutions, or of the ganglia on the floor of the ventricles.

The second case also was that of a middle-aged man, whose illness came on while he was at sea, about ten weeks before it proved fatal. It is said that at first his speech became affected and his manner dull. When admitted, four weeks later, he had pretty complete right-sided hemiplegia, with involvement of the face and tongue, and well-marked aphasia. It was thought, indeed, that his symptoms were due either to hæmorrhage into the left side of the brain, or to plugging of the left middle cerebral artery. But the discovery of optic neuritis rendered it more probable that he was suffering from a cerebral tumour; and this view was confirmed by the slowly progressive aggravation of his symptoms. He gradually became absolutely speechless, and, though able to masticate and swallow, unable apparently to protrude his tongue, or to prevent the saliva dribbling from his mouth. He grew more and more dull and stupid, but not specially drowsy; and, though apparently not understanding anything that was said to him, stared intently and steadily at me, or in my absence at others about his bed. Before his death his pupils became unequal, rhythmical tremors attacked his arms, and his temperature rose.

This patient, like the other, complained of headache; but also like the other, he never had a fit, did not suffer from sickness, and had no trace of paralysis of the ocular muscles. The chief symptoms were headache, right-sided paralysis, aphasia and dementia. Drowsiness was not specially noted in this case.

After death, a tumour was discovered, occupying and evidently originating in the anterior half of the corpus callosum, whence it extended into either centrum ovale. The left centrum was more extensively involved than the other, and on this side the grey matter of the second and third frontal convolutions and of the ascending parietal was involved. There was no disease elsewhere.

The third case occurred quite recently. This case was that of a middle-aged man. The history is not very clear; but he cannot have been ill altogether more than twelve weeks; and

was probably ill for a much shorter period. When received into the hospital ten days before his death, he was partially paralysed in all his extremities, but mainly in the left arm and leg; there was doubtful paralysis on the left side of the face; he was very drowsy, and his speech was slow and indistinct, but he was sensible. During the progress of the case, the paralysis increased, mainly on the left side, and it was thought also that there was some weakness on the left side of the face; he became profoundly sleepy; he lost the power of speech; he manifested some difficulty in chewing and swallowing; and when awake he, like the last patient, stared intently but with a puzzled look at those about him.

This patient resembled the others in the absence of fits, sickness, and paralysis of the ocular muscles. His chief symptoms were, paralysis of the limbs, drowsiness, stupidity, loss of power of speech, and difficulty in getting rid of food placed in his mouth.

The post-mortem examination revealed the presence of a sarcomatous growth, infiltrating the anterior two-thirds of the fornix and corpus callosum, and extending from the latter into the white matter of both hemispheres, chiefly, however, to the right. Neither the grey matter of the surface nor the ganglia were involved.

The close resemblance, if not identity, between these cases as regards their morbid anatomy is obvious. In all of them the growth had clearly originated in the corpus callosum, and had thence extended almost symmetrically along the radiating fibres of this body into the white matter of the hemispheres. There is reason, indeed, to suspect them to be examples of a class of cases which, though attention has not been specially directed to them, are really not uncommon, and not unlikely therefore to be met with in practice.

There was also a considerable resemblance in the collective symptoms presented by them; and I am inclined to think these were sufficiently characteristic to suggest a correct diagnosis. At any rate my former experience enabled me, when the last case came under treatment, to make a happy guess as to its nature, and accurately to predict, as the corpse lay on the table, what would be found when the head was opened.

The chief characteristic features of the cases were:—1st, their ingravescent character, a character which they possessed in common with other cases of cerebral tumour; 2nd, the gradual coming on of hemiplegia, for the most part resembling in its distribution the paralytic symptoms usually attending hæmorrhage into one of the hemispheres, or softening due to embolism; 3rd, the association of paralysis of one side with vague hemiplegic symptoms on the other; 4th, the supervention of stupidity, associated for the most part with extreme drowsiness, a puzzled inquiring look when awake, a difficulty of getting food down the throat, and cessation of speech—I say a difficulty of getting food out of the mouth rather than paralysis of the mouth and throat, and I say a cessation of speech rather than aphasia or loss of articulating power, because it seemed to me, in watching the cases, that these phenomena were due mainly to stupidity and irresistible tendency to sleep, and not definitely to paralysis or affection of the centres for speech; 5th, the absence of implication of the oculo-motor nerves, and of direct implication of other cerebral nerves; and lastly death from coma. It is further noteworthy that some of the more striking symptoms of cerebral tumour were either absent or only slightly developed. Headache did not appear to be very severe in any case, and in one is not so much as mentioned; there was practically no sickness; optic neuritis was certainly absent, at any rate in one case, up to within a week or ten days of death; from first to last the patients were free from epileptic attacks, and never had anything that could be termed a fit.

So far as I know from reading, disease of the median portion of the corpus callosum is unattended with marked, certainly with characteristic, symptoms. And I am inclined to think that my cases are in accord with this statement. In all of them the tumour, taking its whole bulk, was very large; and must have taken much longer to grow than the clinical history gave as the duration of the disease. And in all of them the median part of the corpus callosum was evidently the starting-point of the disease, and this body must have been largely involved before the patient complained of definite cerebral symptoms. Indeed I take it that the symptoms the patients

presented were due chiefly, if not altogether, to the extension of the disease into the hemispheres, and to the diffused pressure on important parts caused by the great collective bulk of the tumour, as evidenced by the extreme flattening of the surface of the hemispheres, and the singular absence of both sub-arachnoid and ventricular fluid. Assuming this explanation to be correct, the progress of a case of the disease I have been describing should be much as follows. First, the occurrence of headache, and other somewhat vague symptoms of progressive cerebral disease. Second, the gradual onset of more or less well-marked hemiplegia. Third, the appearance, in a greater or less degree, of similar symptoms on the opposite side of the body. Fourth, the coming on of dementia, with drowsiness, loss of speech, difficulty in swallowing, and want of control over the rectum and bladder. And these were, in fact, the chief symptoms which my cases presented, and the order of their sequence. Many other symptoms might of course become superadded in the progress of the case, owing either to accidental circumstances, or to the extension of disease into special parts of the brain. Thus, in the second of my cases, there was distinct aphasia, owing to direct involvement of Broca's convolution; and thus, although sickness and epilepsy were absent in the cases I have adduced, I see no reason why they should be absent from all cases of the kind.

The affections with which, as it seems to me, callosal tumours are most liable to be confounded are: hemiplegia due to hæmorrhage or embolism, disease of the medulla oblongata and its vicinity, and general paralysis of the insane.

I presume that if the case were observed from its very beginning, it would scarcely be possible to mistake one of embolism or hæmorrhage for one of progressive disease of the corpus callosum. And even if such a case came under observation late and without a history, its later progress would, I think, be sufficiently suggestive to the watchful physician. The second of my cases came to me with a very imperfect history; and, guided by the fact that he suffered from right hemiplegia with aphasia, I certainly assumed for the first few days that he was suffering from the effects of cerebral hæmorrhage or softening. But the steady downward progress

of the case and the discovery of optic neuritis gave it a different aspect. The difficulty might be increased if the patient, suffering from a recent attack of embolic or hæmorrhagic paralysis, had had a previous attack of hemiplegia on the opposite side of the body.

Disease of the medulla oblongata and its neighbourhood has so far a resemblance to disease of the corpus callosum, that it is apt to be attended with so-called 'cross-paralysis,' and with difficulty in chewing, swallowing, and speaking. But in this case the cross-paralysis is generally not the result of double hemiplegia, but the consequence of the association of hemiplegia with local paralyses due to direct involvement of one or more of the cerebral nerves. Or, to put my meaning in another form: in disease beginning in the corpus callosum, if there be cross or double paralysis, it is owing to the co-existence of more or less complete right and left hemiplegia; whereas in disease of the medulla oblongata, the distinctive symptoms depend on the direct involvement of the nerves of that part, and we are apt to have paralysis not only of the muscles of articulation, mastication, and deglutition, but also of the oculo-motor and other nerves.

At first thought, general paralysis of the insane might seem to have no relation to disease of the corpus callosum; and it must be admitted that the differences are, for the most part, much greater than the resemblances. Yet I am bound to confess that my third case seemed to me, when I first saw it, to be not unlike one of general paralysis; and it was only after watching the case for a day or two that I determined that it was not. The patient had incomplete paralysis of all his limbs; he passed his evacuations into the bed; he had (or said he had) difficulty in protruding his tongue; he spoke slowly and indistinctly; he seemed to masticate and swallow with difficulty; his language was flippant in quality; his face was extremely greasy; and he complained of nothing. Further, he had no optic neuritis, and no sickness. Now this combination of symptoms corresponds very fairly to what we meet with in certain cases of general paralysis, at certain stages of their progress. But, on the other hand, there was no inequality of pupils; there was no distinct tremor of the

lips in speech ; and moreover, his symptoms were those, if of any, of the latest stage of general paralysis, a stage which, I suppose, could not have been reached in the month or two during which alone the patient was ill, and almost certainly could not have been reached unless he had suffered from the epileptiform fits which generally attend that disease.

I have added the fourth case because, although it evidently does not form one of the same group as the other three, it has a close affinity to them, both in its morbid anatomy and in the symptoms which were observed during life. Indeed the symptoms, excepting that they were very much slower in their development, were almost identical with those of the other cases, and might well have justified the diagnosis of tumour starting from the corpus callosum.

The patient was a young woman, whose illness began with headache, giddiness, and sickness, about fifteen or sixteen months before her death, which occurred about eight weeks after her admission into the hospital. To the above symptoms, which gradually increased upon her, failure of sight and difficulty in walking (with a tendency to fall backwards) were added in the course of time. On admission, she complained of headache, giddiness, and blindness ; she could only walk with assistance, and had a manifest tendency to walk on her heels, and to fall over backwards. She was not sick. She had double optic neuritis. There was no definite paralysis, but the tendon reflexes in the legs were exaggerated. Her symptoms rapidly developed while she remained under observation ; she became confined to bed ; she passed her evacuations under her ; her left arm and leg became manifestly paralysed and somewhat rigid ; some weakness of the same side of the face was noticed ; her speech became drawling and indistinct ; extreme drowsiness came on, and with it a tendency to allow her food to remain indefinitely in the mouth. She died comatose.

The patient complained a good deal of headache, also occasionally had hallucinations, but otherwise was sensible ; she was only sick once or twice while she was in the hospital ; and she never had a fit. The oculo-motor nerves remained normal.

The post-mortem examination revealed the presence of a

very large tumour, springing from the surface of the right corpus striatum and optic thalamus, and the neighbouring parts of the floor of the right lateral ventricle, distending this ventricle and displacing the fornix and septum lucidum (which were partly incorporated in it) to the left, and involving also the central and anterior part of the corpus callosum which lay over it.

The corpus callosum was much affected in this case, but I cannot attribute any of the patient's symptoms to this cause. The tumour of the ventricle, partly by the pressure which it exerted on the overlying right hemisphere, partly probably by its encroachment to a slight extent on the subjacent corpus striatum, furnishes ample explanation of the clinical phenomena of the case.

I am sorry to have to state that the exact nature of the tumours in these cases was not (excepting in one instance) determined. I was present, however, at all the post-mortem examinations, and I believe that they were sarcomata.

CASE 1.—Tumour of corpus callosum extending mainly into left centrum ovale; right hemiplegia; loss of memory and intelligence; drowsiness; coma. Death.

C. S., a bricklayer, aged 46, admitted November 13, 1880.

Has enjoyed good health up to ten weeks ago, when he began to suffer from severe frontal headache, and was compelled in consequence to give up work. He had no vomiting or other symptoms. He continued in this state up to three or four weeks before admission when his right hand became weak, his memory began to fail and his mind to be confused. It is said too that his sight became defective. His headache at the same time diminished. In the course of a week or so, the weakness of the right hand and arm had increased, the leg had become implicated, and his loss of intelligence had become more pronounced. About a fortnight since, he took to his bed, and at that time he fancied he was not in his own house. He has gradually been losing the power of walking, and even of standing, without assistance. He has been very drowsy in the daytime, but wakeful at night. He has felt nausea, but not been sick; and his appetite has been fair. He has retained power over his rectum and bladder.

He is a fairly well-nourished man; but his friends say that he

has lost flesh. Cannot stand; but when supported in walking drags his right leg. He does not answer questions readily; will not do what he is told to do, and does not seem to understand all that is said to him; slow in thought and movement. Complains of pain in left frontal region. Face apparently a little smoother on right than on left side; but he opens and closes his eyes equally well, and the mouth is not drawn to left. Tongue protruded straight. No squinting; no double vision; says that he sees well; pupils equal; hearing good. Right arm and leg considerably weaker than left; no impairment of sensation. Patellar-tendon reflex increased in right leg. No affection of thoracic or abdominal organs. Tongue a little coated. Urine free from albumen. No loss of control over emunctories.

On the 18th he was very drowsy, lying with eyes half-closed, and refusing or unable to speak. The day before he was tested in reference to his knowledge of the names of things. He named objects fairly readily; and the only mistake he made was to call an inkstand a penholder. It was noticed that the left eye closed less quickly than the right. About this time he began to pass his evacuations into the bed.

He remained in much the same condition, and on the 28th it was noted that he was still drowsy, and could only be got to speak by repeating questions loudly two or three times; that he ate very slowly; and that he allowed food to remain in his mouth for five minutes or more without attempting to swallow it.

On December 3rd it was observed that the weakness of the right arm and leg had increased, and that the left eyelid did not close so perfectly as the right. He remained in the same drowsy state.

He gradually became weaker and more drowsy; and passed into a condition of complete coma, in which he died on the evening of December 8. His temperature had been normal during the greater part of his stay in the hospital. But it rose to 100.6° on the evening of the 7th, and on the day of his death varied between 101.2° and 104.8° . An hour before death it was 103.6° .

Post-mortem Examination.—All organs were free from disease except the brain. The membranes were healthy; and there was no excess of fluid on the surface, or in the ventricles. The vessels at the base also were healthy. A soft, spongy, vascular, reddish-brown tumour was found occupying the corpus callosum in the greater part of its extent, both from before backwards, and from side to side. It was largest anteriorly, where it occupied the anterior genu; and it extended thence on either side into the

centrum ovale, chiefly, however, on the left side. On the right side it ceased opposite the extremity of the caudate nucleus : but on the left it extended to the expansion of the internal capsule. Neither the convolutions, nor the optic thalami, nor the corpora striata were involved. But the tumour adhered slightly to the upper surfaces of the anterior extremity of the left caudate nucleus.

CASE 2.—Tumour of anterior half of corpus callosum and each hemisphere, and on the left side involving the frontal convolutions ; right hemiplegia ; aphasia ; optic neuritis ; rhythmical tremors ; stupidity. Death, with high temperature.

Joseph McK., a sailor aged 41, was admitted under my care on April 19, 1882.

Four weeks ago, while at sea, his speech became affected, and his manner dull. About the same time, or a little later, the right arm and leg got weak. He had no fit. The symptoms have increased upon him ; and for two or three weeks he has kept his bed. He has not been emotional, and has retained power over his evacuations.

There is complete right hemiplegia. He cannot move either arm or leg ; the mouth is drawn to the left ; and the tongue is protruded towards the right. The leg is somewhat rigid, but the arm is limp. The tendon and superficial reflexes are normal on both sides ; and there does not appear to be any impairment of sensation. No affection of ocular muscles ; pupils contracted and equal ; sight apparently good. No difficulty in deglutition. He can say a few words, and seems to understand fully what is said to him, but is evidently aphasic to an extreme degree. Does not repeat words to dictation. Hearing imperfect, especially on right side.

Tongue clean ; no sickness ; bowels open. Heart healthy. Urine free from albumen, sp. gr. 1025. Temperature normal.

At this time it was believed that the patient was suffering from an ordinary attack of hemiplegia due to hæmorrhage. But on the 24th his eyes were examined with the ophthalmoscope. It was then seen that the right optic disc was hazy and woolly, that some of the vessels had white lines along them, and that the veins were slightly dilated ; but that the left eye was healthy.

27th.—He is in much the same condition, excepting that his loss of speech has become more marked. He now only says 'no' in answer to every question. But, though there is doubtless some impairment of intelligence, he seems to understand all that is said to him, and tries to reply and do what he is told. He evidently

recognises all objects that are shown him, and even their names when repeated to him. He answers 'no,' but at the same time shakes his head in negation, or nods affirmatively, as the case may be. He can copy letters imperfectly with his left hand, but cannot write. He does not recognise printed words or letters; at any rate he recognises them very imperfectly. He has some headache on the left side. The paralysis remains as before; but it is thought that there is also some impairment of sensation on the paralysed side.

A further examination with the ophthalmoscope was made by Mr. Nettleship. He confirms the description already given of the right disc; but he observes that the left disc is not absolutely clear; that at least three of the vessels bend abruptly just outside its margin; that there is slight neuritis.

From this time the change in the patient from day to day was slight; but on the whole he slowly got worse. He suffered more or less from headache, always referred to the left side. The paralysis of his limbs remained complete; but the arm after two or three weeks grew rigid; and the tendon and plantar reflexes in the right leg became exaggerated. No squint appeared, but the left pupil became at first smaller and subsequently larger than the right. A difficulty in protruding his tongue came on, and saliva at times dribbled from his mouth, but he could masticate and swallow. The slight hemianæsthesia continued. He lost the power of speech absolutely, and gradually became dull and stupid; and, though looking at and watching intently anyone who addressed him, apparently made no effort to respond. Occasionally he seemed fretful; but on the whole he was utterly apathetic. The pain in his head was relieved once or twice by the application of a few leeches to the temples.

On May 20 the following note was taken:—'The patient lies in an apathetic condition, taking very little notice of anything, and seeming not to understand when spoken to. His chief employment is gnawing a flannel roller or his handkerchief. The paralysis remains complete; and the arm, but not the leg, is rigid. He seems unable to put out his tongue, and is wholly speechless. But he can swallow, and has a good appetite. The pupils are equally dilated, but from the effects of atropine. He apparently has pain on the right side of the head. His evacuations are passed unconsciously. For the first time his temperature rose to-day to 100·8°.'

From this day he gradually sank. He got more and more dull and stupid. Rhythmical tremors came on in his arms, but only when they were moved voluntarily or by force. The pupils became unequal, the right being the smaller. Profuse perspirations broke

out, and the temperature rose. On the 26th it reached 102° ; on the 27th, 103° ; on the 28th, 105.4° ; and just before his death (which occurred a little after 8 P.M. on the 29th), 107.4° .

Post-mortem Examination.—Dura mater normal. There was no excess of fluid either in the subarachnoid tissue or in the ventricles, and no trace of meningitis. The surface of the left cerebral hemisphere was perhaps a little more prominent than that of its fellow. On making careful transverse and longitudinal sections of the brain, a large, infiltrating, ill-defined growth was found, involving the anterior half of the corpus callosum, and extending thence, on the left side, into the substance of the hemisphere, so as to occupy nearly the whole of the anterior half of its white matter, together with the grey matter of the second and third frontal convolutions and the ascending frontal; and on the right side so as to implicate a considerable portion of the right centrum ovale in the corresponding situation, but not reaching the grey matter. The tumour was above the level of the corpora striata and optic thalami, and did not affect them, or the internal capsules. The new-growth was greyish in tint, and looked soft. But it was really tough, and cut crisply. The portion occupying the left hemisphere was spongy; that on the right side was more homogeneous in texture, but presented a series of concentric markings.

All the other organs were healthy.

CASE 3.—*Tumour of anterior three-fourths of corpus callosum, extending into the white matter of the hemispheres; imperfect paralysis, mainly of the left side; difficulty of speech; great drowsiness and stupidity. Death.*

J. H. P., an accountant, 51 years of age, was admitted under my care on the 21st of July, 1884.

He had been a strong and healthy man until ten weeks previously, when he was attacked with quinsy. He was ill with this complaint for a fortnight or more, and remained feeble for a few weeks longer. But he finally got quite well, and is said to have remained well until ten days before admission. At that time it was supposed that he was overcome by the heat of the weather; at any rate he became weak, and his weakness has increased from that time. He was sent to the hospital with the statement, that he was suffering from diphtheritic paralysis.

A well-nourished man. He was very drowsy, but when fully awake appeared to be quite sensible, and, though speaking slowly, made pertinent, indeed somewhat flippant, answers to questions.

But his articulation was indistinct. He did not fully open his mouth or put out his tongue when told to do so, and said that he could not. The right side of the face was thought to be a little less mobile than the left. There was loss of power in both upper extremities; and the left was flexed and somewhat rigid. The legs also were weak. The right he seemed unable to move, the left he moved slightly. The tendon reflexes were present and normal, as also were the cutaneous reflexes. There was no loss of sensation anywhere. There was no nystagmus; no squint. The pupils were of normal size, equal, and acted to light. His urine was passed into the bed.

No affection of heart or lungs. Pulse 80. Abdominal organs all healthy.

I saw him the next day, and his condition accorded in the main with the above description. But his drowsiness had increased; and it was very difficult to wake him, or to keep him awake. He seemed to have a little difficulty in swallowing, and in getting the food out of his mouth. This, however, might have been due to his sleepiness. He answered questions only when fully roused, and then sensibly, though slowly and somewhat indistinctly. There did not appear to be any actual aphasia. He said that he had little or no pain. The eyes were quite normal as to pupils and movement, and ophthalmoscopic examination revealed nothing amiss. The evacuations were passed unconsciously; and the urine, which had a specific gravity of 1032, was acid, and free from albumen and sugar.

He continued in much the same state for the next two or three days. On the 26th I made the following note:—'Patient still passes everything into the bed. He is much less drowsy than when I last saw him. Hears, but does not seem to understand, what is said to him. When spoken to loudly, makes some attempt to do what he is told or to answer, but his speech is mumbling and unintelligible. He keeps his eyes intently fixed on my face, and follows me with them when I move. He has a little difficulty in chewing and swallowing, and occasionally chokes. There is no paralysis of ocular muscles, or affection of the pupils. The left side of the face is perhaps a little weaker than the right. Moves right arm more than left, but both are weak and somewhat rigid. Legs as before. Sensation perfect. Face very greasy.'

Henceforth his symptoms underwent scarcely any change. He became perhaps more drowsy and difficult to wake, and difficult to feed on account of his drowsiness. There was no obvious increase of paralysis, but certainly no improvement in this respect; and his evacuations were still discharged into the bed. He occasionally

tried to speak; but the sounds he uttered were unintelligible. On the 28th his pulse was 112, but his breathing normal. On the 29th his urine, which was still free from sugar and albumen, was strongly alkaline, and its specific gravity 1035. On the evening of the 30th he had an attack of dyspnoea, attended with rattling in the throat; and the respirations rose to 54 in the minute. The dyspnoea subsided in the course of a few hours. During the whole of the 31st he was unconscious. It was noticed that both arms, but chiefly the left, were rigid. At six in the evening he began to breathe stertorously, and he died three hours later.

It is noticeable that the patient never complained of, or seemed to suffer from, headache; that there was never any sickness; and that he had never had anything of the nature of a fit. His temperature during the first three days varied between 98.4° and 99.8° . During the next seven days it rose every evening to between 100° and 100.6° . Shortly before death it attained 102.2° .

Autopsy.—On removing the dura mater the convolutions were found universally flattened, the surface of the brain dry, and the pia mater and veins everywhere remarkably congested. But there was no appearance of inflammatory effusion, and there were no adhesions. No fluid was found at the base of the skull; and none escaped from the lateral ventricles as the brain was removed. The arteries were all healthy. On separating the hemispheres, the corpus callosum was seen to be much arched from before backwards; and the surface of its anterior two-thirds, as far outwards on either side as it could be traced, was yellowish and irregularly nodulated. On further examination, it was found that the anterior three-fourths of the corpus callosum, and the corresponding portion of the fornix (including the anterior genu of the former, and the anterior pillars of the latter) were the seat of a growth, which had caused the affected part of the corpus callosum to be at least as thick again as natural, and the fornix to measure in some places about half an inch in thickness. The general form of these bodies was, however, retained. The diseased fornix was grey, translucent, soft, and vascular, and had the appearance of being the seat of growing sarcoma. The corpus callosum presented patches of the same kind of material, but was mainly the seat of a toughish, opaque, buff-coloured reticulum with coarse irregular meshes, occupied in part by the growth above described, in part by a gelatinous kind of material, or a serous fluid. The diseased textures extended from the corpus callosum on either side into the anterior half of the centrum ovale majus, which was involved in almost its whole extent above the level of the corpus

striatum. The disease was somewhat more extensive and more advanced on the right than on the left side; and the affected tissues had exactly the same characters as those presented by the central part of the corpus callosum. There was no very definite limit between the tumours and the brain-tissue around, which latter was soft and much congested. Microscopic examination showed that the tumour was a sarcoma, undergoing in places degenerative changes. The grey matter of the convolutions was everywhere healthy; the ganglia at the base were also altogether healthy; and the lateral ventricles contained only a minute quantity of fluid. There was no disease elsewhere in the brain, or in the body.

CASE 4.—*Tumour springing from floor of right lateral ventricle, and involving the septum lucidum, fornix, and corpus callosum. Headache, optic neuritis, blindness, left hemiplegia, drowsiness, coma. Death.*

Florence M., an unmarried woman 25 years of age, was admitted into St. Thomas's under my care on June 13, 1883.

She is said to have been a delicate woman, but to have suffered from no serious illness until fourteen months ago, when she had a sharp attack of small-pox. She dates her present illness from that time. The first symptoms were pain at the top of the head and across the eyes, giddiness, sickness mainly in the morning, and weakness in the legs. These symptoms gradually became more severe, and latterly her eyesight has been failing. For some time past, when standing, she has had a tendency to fall backwards. She has been quite sensible all along, and has had no fits. No history or sign of syphilis.

She is a florid, healthy-looking woman, perfectly sensible, and ready of speech. She complains of vertex headache, of blindness, and of difficulty in walking. The headache varies, but is never severe. The eyes are very prominent, but otherwise look natural. Their movements are consensual and normal, excepting that the corneæ are never turned completely into the outer or inner canthi. The pupils are equal, but act neither to light nor to accommodation. Sight is almost gone; the patient can only distinguish light from darkness. There is double optic neuritis; the discs are much swollen, but little congested; the vessels are tortuous and slightly obscured at the edges. There is no paralysis of either side of face or tongue, and mastication and deglutition are unaffected. Sensation is perfect in head and face. Hearing and taste are normal. Says she has lost smell, but she recognises ammonia and acetic acid.

There is no paralysis, rigidity, tremor, or wasting of arms or legs. But the legs present exaggeration of plantar and tendon reflexes, with clonus at ankles and knees. There is no apparent impairment of sensation. But she says she feels as if walking on wool. She can stand and walk, though with difficulty. The gait is a little peculiar. There is no ataxia, but she walks very much on her heels, and has a constant tendency to fall backwards with an inclination to the right. There is no affection of bladder or rectum, and the catamenia are regular. No bed-sores. Thoracic and abdominal organs apparently all healthy. Urine free from albumen.

The patient rapidly got worse after admission. In three or four days it was found she could not stand without being supported on both sides. On the 18th it was noticed that she was excited; and on that day and for several days subsequently she had optical hallucinations, addressed imaginary persons, and said she saw soldiers all dressed in blue. This condition disappeared after a few days, and apparently did not recur. Then and thenceforth she was emotional, sometimes low-spirited, but more frequently jovial. On the 23rd and 24th she passed her evacuations unconsciously, and for the most part they escaped without control during the remainder of her life.

Early in July she began to suffer from drowsiness. About the 8th it was observed that the mouth was drawn slightly to the right when she laughed or spoke; that the right eye closed a little more than the other when she smiled; and that her speech was slow and drawling.

On the 15th it was remarked that the right arm seemed to be weaker than it had been, and that the left was occasionally rigid.

Subsequent observation confirmed the fact of slight left facial palsy; and that of comparative weakness with rigidity of the left arm and leg, the rigidity being occasional. Once or twice the tongue was protruded towards the left.

Her headache continued, and on two or three occasions she was sick. From the time of its commencement, her drowsiness, with occasional intermissions, continued, and increased upon her. And for the last week or two of her life it was so constant and so profound that there was the greatest difficulty in rousing her even for a moment; and it became a long and weary work to give her nourishment, inasmuch as she went to sleep with the food in her mouth, and, if left, would allow the food to remain there for half an hour or more at a time. She generally lay with the tongue lolling out of her mouth.

Finally her drowsiness passed into coma, and in this condition she died, early in the morning of August 5.

She never had a fit. Her temperature throughout her illness was generally normal. Occasionally, however, it rose to 100° , and shortly before death reached 100.8° .

Autopsy.—A well-nourished young woman, with very crooked legs, the consequence of rickets.

On opening the head, the convolutions were found to be flattened, the surface generally dry, and the pia mater uniformly congested. On removing the brain, there was no accumulation of fluid at the base, and no visible sign of inflammation; but it was noticed that the space between the crura cerebri was widened, and that the optic tracts were stretched. The infundibulum, however, was not prominent, and no fluid oozed from this part. On slicing away the upper part of the hemispheres, the corpus callosum was found to be unusually arched from before backwards, and also from side to side, as though raised by some subjacent accumulation, situated mainly towards its anterior part. The dissection was now conducted with care, and the following are the results which were arrived at: 'A very soft, pinkish, vascular growth, much lobulated on the surface, measuring about $4\frac{1}{2}$ inches from before backwards, $3\frac{1}{2}$ from side to side, and from 1 to $2\frac{1}{2}$ in thickness, sprang mushroom-like from the surface of the right corpus striatum and anterior part of the right optic thalamus, and from the floor of the anterior cornu and of the ventricle external to the ganglia. The subjacent brain-substance was scarcely, if at all, encroached on by it. The growth occupied the whole of the distended right ventricle, excepting its descending and posterior cornua; and, pushing the septum lucidum over to the left side, stretching it and incorporating it to a large extent, formed a lobulated protrusion into the left ventricle. The fornix also was largely displaced to the left and stretched over the tumour; and the greater part of it, like the septum, was incorporated in it and lost. The corpus callosum, in its central area, was stretched over the tumour, adherent to it, and partly destroyed by it. Although the tumour had obviously originated in the right ventricle, about a fourth of the bulk was to the left of the mesial line. The third ventricle was a little displaced, but normal in all other respects. There was very little fluid in the cavities. The brain, with the exception above noted, was quite healthy. The tumour, judging from hasty examination, was a sarcoma.'

Abdominal and thoracic viscera all healthy.

POSTSCRIPT.—I add the next case, which has occurred to me since the above paper was written, simply because it belongs to the group of cases therein discussed. That is to say, it is

a case of tumour originating in the corpus callosum, and extending with the fibres of that body into the adjacent substance of the hemispheres. The case, however, throws no light on the diagnosis of the disease. Its duration was only three weeks from the first appearance of symptoms. These were mainly epileptiform convulsions, together with such other symptoms as are common to cerebral tumours. None of them were distinctive either of the nature of the disease or of its site. This was probably due to the comparatively small size of the tumour, and its limitation to the corpus callosum.

CASE 5.—*Tumour of the corpus callosum; epileptic fits. Death.*

ISAAC H., a brass-finisher, aged 58, was admitted March 7, 1888. He has had good health until within the last fortnight. During this time he has been out of work; and for nearly the whole of it has been dull, not caring to converse, or answering in a strange way, and avoiding society. On the morning of the day before admission he complained, for the first time, of pain over the top of the head, and was drowsy. At midnight he went to bed with his clothes on and slept soundly. At 5 A.M. (the 7th) he was found in a fit; insensible, pale, muscles of face quivering, and arms and legs moving spasmodically. He passed his water unconsciously. The fit soon passed; and it was then noticed that he did not move his right arm or leg. He was partially conscious; said 'yes' in answer to questions; and when asked what was the matter put his left hand to his forehead and said, 'head.' He had eight or nine fits in the course of the next three hours; and was brought to the hospital at 8 A.M.

From the time of admission until 4 P.M., the patient had innumerable fits at short intervals, and remained unconscious. The fits began with slight catching of the breath, followed by deviation of the head and eyes to the right, and rigidity, with slight convulsive movements, of the right arm and leg. There were also convulsive movements of the muscles of the face, chiefly on the right side; the face was pale; the nose and ears livid; the pupils inactive to light. In the later fits the deviation of the head and eyes was to the left. Between the fits the right arm and leg were observed to be paralysed. At noon the temperature was 105.4° ; at four, 101.2° , at which time the pulse was 136, the respirations 64, and occasionally presenting the Cheyne-Stokes character.

8th.—Has had no fit since 4 P.M. yesterday. Was conscious last

night, and said to his son, when he was leaving him, 'Don't go.' He continues sensible; attempts to answer when addressed, but speaks hesitatingly and misapplies words. The head and eyes are still turned to the left; the pupils are unequal and inactive; the fundi of the eyes are normal; the right limbs are still weak. He can swallow without difficulty. Pulse, 108: respirations, 40: temperature from 99.8° to 101.2° .

During the next few days there was, on the whole, gradual improvement. He recovered almost completely the use of his right arm and leg, and to a considerable extent that of speech. This continued hesitating, however; and he still presented some difficulty in naming objects. He had no pain, and he took food fairly well. His evacuations were passed into the bed. His pulse and respirations both continued quick, and his temperature above 100° . On the 10th and on the 11th it rose to 103° and 103.6° respectively. The urine was free from albumen.

On the 14th his temperature was less than it had been, and varied during the day from 97.6 to 99.8 . His pulse was 108, regular; his respirations 40, rather noisy and presenting at times the Cheyne-Stokes character. He spoke only when spoken to, and answered sensibly though indistinctly, and he took food well. On the whole he seemed to be mending.

15th.—His breathing became very bad last night, more stertorous, generally at the rate of 48 in the minute, but presenting frequent cessations of several seconds' duration. His face was livid. These conditions persisted. And in the morning he was semi-comatose, not taking any notice when spoken to, keeping his eyes closed, and turning his head away when the attempt was made to open them for him. His coma deepened, and, without any material change in his symptoms, he died at 4.15 in the afternoon. His temperature during the last day varied from 99.6° in the early morning to 101.4° at the time of death.

Autopsy.—Chest: lungs adherent at apices; fibrous septa radiating inwards from pleuræ, among which were a few caseous nodules; heart healthy. Abdominal viscera, including kidneys, all healthy. Head: membranes and sinuses free from disease; pia mater generally much congested; otherwise external appearance of brain normal. In making horizontal sections, when the level of the upper surface of the corpus callosum was reached, a very vascular little island was cut through in the left hemisphere just external to the head of the caudate nucleus. The next section showed that this was the external limit on the left side of a soft, very vascular, loose-textured, yellow and red new-growth, which

occupied the anterior fourth of the corpus callosum, and radiated with it outwards and forwards into the white matter of the hemispheres. The growth did not extend on either side beyond the outer limit of the caudate nuclei. The right nucleus was not at all implicated, the left only just grazed. The new-growth involved the anterior genu of the corpus callosum, and the lamina extending thence to the under surface of the brain. It was wholly limited to the corpus callosum and the fibres radiating from it ; and on raising this body from the cerebral ganglia on which it rests, the tumour was raised in it. The rest of the brain was healthy ; the ventricles were not dilated. The tumour was a sarcoma.

XX.

*ON TUMOURS INVOLVING THE PARTS IN THE
NEIGHBOURHOOD OF THE THIRD AND
FOURTH VENTRICLES AND THE AQUEDUCT
OF SYLVIUS.¹*

THE cases which I am about to narrate and discuss were cases which interested me much during life, and are all the more instructive that they each became elucidated, in the course of time, by a post-mortem examination. The first case was one in which a tubercular mass had destroyed the corpora quadrigemina, and by pressure displaced the iter downwards and forwards; the second was one in which a tumour sprang apparently from the valve of Vieussens and processus e cerebello ad testes, and had invaded the corpora quadrigemina and cerebellum, and become adherent to the floor of the fourth ventricle; and the third was one in which a tubercular growth occupied the third ventricle and implicated the adjoining optic thalami. The fourth and fifth cases scarcely belong to the same category; inasmuch as the fourth was a case of tubercle of the cerebellum, and the fifth a case of chronic hydrocephalus. But I have ventured to add them to the others because, in the former the cerebellar tumour pressed upon the floor of the fourth ventricle, to which fact probably some of the symptoms attending it were due; and in the latter, owing to obliteration of the iter, the fourth ventricle formed an independent cyst, and thus its most interesting pathological feature was the presence of disease in the vicinity of the lesions presented by the other cases.

¹ *Brain*, July 1883.

The first case was that of a little boy of seven, whose illness terminated fatally after six months' duration. The earliest symptom of his malady was, it was said, loss of power in the right arm and leg, coming on suddenly. But before long all his limbs became paretic and tremulous on movement; and his head and neck also displayed tremors when unsupported. Further, he showed marked symptoms of ophthalmoplegia externa: protrusion of the eyeballs, ptosis, and paralysis probably of all the ocular muscles, though mainly of the superior and internal recti. Moreover, the eyes had a tendency to act independently of one another. Sight, however, remained perfect; the pupils (though at times unequal) acted to light and to accommodation; and there was no optic neuritis. His speech was drawling, and attended with tremors of the lips. There was absence of headache, vomiting, and convulsions. Among subordinate symptoms, either present from the beginning, or coming on in the course of the case, were drowsiness, indistinct facial paralysis, exaggeration of the knee-jerk in both legs, with stiffness of the right, and loss of control over the evacuations. During the last few days of life acute symptoms came on, with considerable rise of temperature, which were due to the supervention of tubercular meningitis.

Now it was not difficult, during the patient's life, to make a shrewd guess as to the seat of his intracranial lesion, and even as to its nature. A young child is much more likely to suffer from a tumour than from sclerosis; and a tumour is, in such a case, much more likely to be tubercular than of any other character. That the child was suffering from a tubercular growth was rendered almost certain later in his career, when symptoms of meningitis were added to his other symptoms. At any rate it was assumed, when he first came under observation, that, notwithstanding the absence of headache, vomiting, optic neuritis, and fits, he was suffering from cerebral tumour. The seat of the tumour was indicated by the ocular paralyses. It was evident that the nerve-trunks were not involved, and the nerve-nuclei were not destroyed; and hence, either that the tumour was higher up or more anterior than the nuclei, or that it simply compressed them. The

partial, and to some extent variable, facial palsy, with the absence of implication of any of the cerebral motor nerves below, and of any of the nerves of special sense, further seemed to indicate that the disease was in the corpora quadrigemina or their immediate neighbourhood. The presence of universal muscular weakness, with tremors, and the absence of actual paralysis of the limbs, indicated rather symmetrical compression and irritation of the motor tracts, than their actual destruction by a tumour.

At the post-mortem examination there was found, in addition to recent tubercular meningitis, a solitary tubercular mass, about as large as a marble, embedded in the corpora quadrigemina, destroying these bodies, and displacing and indenting the tracts of nervous matter situated to the outer side of, and below, the aqueduct of Sylvius.

The second case was in many respects much more interesting than the first. It was that of a young lady of twenty, whose illness extended over rather more than two years; and whose condition, up to two months before her death, was attributed to aggravated hysteria. The first symptom noticed was loss of power in the middle finger of her left hand, which interfered with her playing on the piano. To this succeeded deafness of the left ear, and dimness of the left eye, which before long also presented an inward squint. Later, she complained of numbness in the left arm and leg; and of some stiffness, associated with tremors, in the legs. The phenomena above described became slowly developed, one after another, during a period of eighteen months. During the next four months, however, the progress of her disease was rapid. She became deaf and blind; the left eye turned outwards instead of in; she spoke in a drawling, whining tone, and was at times incoherent; and her limbs became generally very weak, and all her movements were attended with tremors. On admission, two months before her death, she was for the most part in the condition just described. She could stand and walk when supported; but all her limbs were weak, and these and her head and neck trembled, as in disseminated sclerosis; she was quite deaf and blind; there was no ptosis, but the eyes diverged and acted at times independently

of one another. The paralysis was most complete in the right external rectus; but apparently all the muscles of the right eye were weak. There was probably also some weakness of some of the muscles of the left eye, which also presented rotatory nystagmus. The pupils were unequal, and there was double optic neuritis. She drawled in speech, and was affectionate, not to say amorous, in her manner. There was slight paralysis of the right facial. When she had been in hospital about a fortnight, a mattery discharge took place from her right ear, which continued until her death. In this case, as in the last, the patient was very drowsy, and there was (at any rate to within a day or two of her death) no headache, sickness, or convulsions. During the last few days of life, the weakness in her legs increased; she had violent general tremors at times; she presented difficulty of swallowing; the veins of the inner halves of the eyelids became swollen; and her temperature rose.

In this case, as in the former one, it seemed clear during life that the patient was suffering from a cerebral tumour. And the association of absolute deafness with the ocular troubles, partial facial paralysis, and general paresis and trembling, rendered it pretty clear that the tumour was seated somewhere about the fourth ventricle, and was of considerable extent. There were some points in the case, however, that added a little obscurity to it. Was the loss of power, limited to a single finger (which was her earliest complaint), referrible to the tumour, which, as it grew, ultimately caused her other symptoms? Could the persistent, though lately developed, otorrhœa have any relation to a tumour occupying the substance of the brain, or was there a mere chance association between them?

The post-mortem examination showed that the diagnosis made during life was accurate, and suggested an explanation of some of the other incidents of the case. A largish growth was found springing apparently from the valve of Vieussens and the processus e cerebello ad testes, which was adherent to the floor of the fourth ventricle in nearly its whole extent, and had involved the testes and cerebellum. But it was found also that the dura mater at the base of the skull, in every one

of the fossæ, was the seat, in a greater or less degree, of the same kind of disease. The discharge from the ear was doubtless dependent on the latter complication. I could not, however, determine that any of the paralytic phenomena were due to involvement of cranial nerves, or narrowing of their foramina of exit.

The third case was that of a little boy, four years old, and was obviously (as will be seen from a perusal of the history) one of tubercular growth in the brain. The symptoms of his cerebral affection lasted nine months. They began with tremors, and slight loss of power in the left arm and leg; which were followed in the course of a month or six weeks by tremors in the limbs of the opposite side. These tremors were like those of disseminated sclerosis. The left side of the face also presented spasmodic movements at this time. About six months from the beginning of his illness (the symptoms having made gradual progress), the left arm and leg had become rigid; the tremors of the right arm and leg had increased; there was some twitching in the left side of the face, with paresis of the left facial nerve; he had commencing double optic neuritis; he drawled in his speech; he was extremely drowsy; and he passed his evacuations into the bed. These symptoms presented little change up to a week before his death; when his temperature rose, he vomited, and presented other symptoms of acute meningitis, of which he died. In this case, as in the others, there were no fits, no headache, no sickness, and the appetite was extremely good. It is important also to note that there was no paralysis of any cerebral nerve. There was, no doubt, weakness of the left facial, but this was clearly hemiplegic.

Where was the tumour that caused the symptoms above described? I confess I thought it would be found in the cerebellum. And I still think that this diagnosis was justifiable. The tumour, however, was found occupying the third ventricle, and involving to some extent both optic thalami. And I am inclined to think that, with the guidance of such cases as the first two narrated, a correct diagnosis might have been arrived at.

In reviewing these cases collectively, it is impossible not to

see that they presented many features in common, which were probably due to the fact that the same tract or tracts were involved, and the same tract or tracts avoided, in each ; and, at the same time, many points of distinction which were clearly referrible to the additional involvement in each case of special centres or regions.

The chief points of resemblance between them were the following :—general paresis, with tremors like those of disseminated sclerosis ; drawling speech, reminding one somewhat of that observed in myxœdema, and in one case attended with marked tremors of the lips, and thus presenting a close resemblance to the speech of general paralysis ; remarkable drowsiness, with more or less emotional disturbance and loss of control over the emunctories ; and, in association therewith, absence of anæsthesia, headache, convulsions, and sickness, and the presence of an excellent, if not voracious, appetite.

The chief distinctive features, which may be attributed to difference of seat of lesion, were the following. In the first case, paralysis of both third nerves, and probably of both fourth nerves, without implication of the irides or muscles of accommodation ; due probably to compression of the nuclei of origin of these nerves. In the second case, deafness on both sides, with some involvement of one, if not of both, third nerves ; due probably to extension of disease into the auditory nuclei, and to pressure on the nuclei of the third nerves. In the third case, the absence of all specific phenomena ; owing to the fact that the tumour was seated above the origins of the motor cranial nerves.

There were other phenomena presented by the cases, to which more or less importance may be attached ; but to which, on account of their frequency in brain-affections, I have not ventured to assign any specific value. Among them were, paralysis of the sixth nerve, observed in one, if not in two, of the cases ; incomplete facial palsy, probably independent of direct involvement of the seventh nerve ; optic neuritis, which was marked in two of the cases ; blindness, probably the consequence of neuritis ; and the symptoms due to the supervention of

meningitis observed shortly before death in the two tubercular cases.

The fourth case presented a close superficial resemblance to the third. The patient was four years old; his illness lasted for nine months; he had in the beginning, and for some months subsequently, tremors of both arms, and of the head and neck, which (so far as the arms were concerned) gave way to rigidity some time before death; his speech was drawling and monotonous; and he had double optic neuritis with blindness. Further, he never suffered from sickness. But he suffered constantly from what none of the other patients had experienced, namely headache and epileptiform seizures; he presented, more markedly than any of them, the so-called 'cerebellar gait;' and, in the course of his illness, paralysis of the left sixth and seventh nerves came on. Pathologically the case was most like the second; for although the tumour (which was of somewhat larger size) was a cerebellar tumour, it exerted manifest pressure on the floor of the fourth ventricle, mainly its left half. It was doubtless owing to this pressure that the patient had paralysis of the left sixth and seventh nerves; and probably owing to the same cause that he suffered from tremors of the head and neck and arms, and that his speech was drawling.

The appearances discovered after death showed that, in the fifth case, the lesion from which the patient suffered was of old date. It consisted, in fact, of dropsical effusion into the lateral and third ventricles, into the fourth ventricle, and into the central canal of the spinal cord. An interesting point, however, in the case was that the dropsical accumulation in the fourth ventricle was cut off from the accumulations in the neighbouring cavities.

The symptoms (excepting that the head was unusually large) did not point to the nature of the patient's malady. He died of a convulsive attack, of which he had had several during the last four or five months of his life. And his other chief symptoms were, feebleness and unsteadiness of gait, rigidity of the neck, headache, occasional double vision, and slight feebleness of mind with tendency to be noisy at night. He had no paralysis and no tremors.

CASE 1.—*Tubercular tumour of the corpora quadrigemina, followed by tubercular meningitis; paralysis of both third nerves, with ptosis, and tremors of head and neck, arms and legs; no fits; sickness and headache absent until the occurrence of meningitis; no optic neuritis. Death. Autopsy.*

Edward B., a schoolboy aged 7, was admitted under my care on August 2, 1882.

His illness began about the latter end of May. He is said to have gone to bed well, and to have got up the next morning with inability to walk properly, and with marked weakness in the right arm and leg. About a week later his eyes became affected, and gradually assumed their present condition. His speech became impaired at the same time. He has had no headache, no vomiting, no fits; his memory has not suffered, and his temper has remained good; his appetite has been unimpaired, his bowels constipated. He has been drowsy latterly, however; and for the last few days has passed his evacuations into the bed. He has also been getting weak and thin; and tremulous movements of the limbs have been gradually developing.

The child is thin, and has a large head; which, when he sits up, is usually thrown somewhat backwards. He is drowsy and dull; but when fully roused appears to be perfectly sensible. The limbs are all weak; but there is no distinct paralysis of any of them. When he sits up, the head trembles; when he moves his arms, the movements are attended with coarse undulatory tremors; and when he stands or walks, similar tremors affect the legs, and become transmitted to the body generally. The eyes are both unduly prominent; there is ptosis on both sides; and also distinct paralysis of the superior and internal recti of the right eye, which looks outwards, and apparently a less degree of the same paralysis on the left side. The right pupil is slightly larger than the left; but both pupils act to light and accommodation. Sight appears to be perfect. The mouth is drawn a little to the right when the child laughs, but there is no other evidence of facial paralysis. The tongue is protruded straight. Speech is slow, drawling, and monotonous. No difficulty in swallowing. Hearing unaffected. No impairment of sensation. Superficial and tendon reflexes normal. Tongue clean; appetite good; bowels confined. Urine 1030; lithates, no albumen. No sign of thoracic or abdominal disease.

For the next three weeks there was no marked change in his condition. The description above given of him was in the main confirmed. Drowsiness and apathy varied in degree, but were

generally present ; he had no headache or sickness ; his evacuations were sometimes restrained, but occasionally escaped unwittingly ; the tremors continued, but it was noticed also that the lips trembled when he spoke ; the paralytic condition of the eye-muscles remained much as it was ; and it was ascertained that the fundi of the eyes were healthy. It was noticed, further, that occasionally sudden spasmodic tremors convulsed his whole frame. But there was no apparent loss of consciousness in these attacks. He retained his good-humour.

About the 25th of the month, and for a day or two afterwards, he complained of some occipital headache.

During the next month, again, there was very little change on the whole ; except, perhaps, that drowsiness and disinclination to speak or to take notice of things increased ; that he became irritable, and apt to cry out at times, and even to try to bite when annoyed ; that his evacuations were now all passed involuntarily ; that he got less and less able to support himself in the sitting posture ; and that his tendon reflexes became exaggerated. The tendency to retract the head continued ; the tremors of his head and neck and limbs did not diminish, possibly increased ; the slight paralysis of the right facial nerve was still observable, and the prominence of his eyeballs continued. On September 26 his eyes were examined by Mr. Nettleship, who reported as follows :—‘ All the movements of the eyes are more or less imperfect, unless it be the movement downwards, which is better executed than the rest. The defect is greatest in the right eye, both as to the levator palpebræ, the superior rectus, and the internal rectus. The paresis of the external recti is considerably less marked than that of the superior and the internal recti. The right eye is directed outwards, and stands on a rather lower level than the left. The pupils are equal, of natural size, and act well to light. Action to accommodation I could not determine. The oculo-motor symptoms point to disease higher up than the trunks of the nerves, and missing the centres for the iris and ciliary muscles.’ Sight seemed to be perfect, and there was no optic neuritis.

For the rest of September, and during the whole of October, the condition of the child scarcely presented any change. There was no increase of paralysis ; he still seemed to understand, but was unable or indisposed to reply, and rarely spoke. But his attention could be aroused, and he could be made to laugh. The eyes were examined on several occasions, and the fundi were always found normal. He never had any distinct indication of headache, and never any sickness, or any fits.

About November 10, it was noticed that he was a good deal weaker; that he had ceased to know his mother when she came; but that nevertheless he could see, and if a piece of cake was held up before him would grab at it; that the right pupil was much larger than the left, that both acted badly to light, and that there were no internal ophthalmological changes; that the mouth twitched a little to the left; that the patellar tendon reflexes were brisk; and that there was a tendency to rigidity of the right leg.

On the 17th it was remarked that the boy had been getting more and more drowsy and indisposed to speak, though now and then inclined to be noisy; that the paralytic condition of the eyes remained, and that the ptosis was becoming more marked, especially on right side; that the tremulous movements had largely diminished, and that he still had no sickness, no obvious pain in head, and no fits.

On the 18th he vomited, and again vomited on the 20th. The vomiting still continued; on the 22nd it was observed that he often put his hands to his head as if in pain, and that the tremors in his arms and head had returned. After this he became weaker and quieter, refused his food and continued to vomit occasionally; and his temperature, which had nearly always been normal, rose. On the 25th it reached 100° ; on the 26th, 101.2° ; on the 27th, 101° ; on the 28th, 101.6° ; on the 29th, 102° ; and on the 30th (the day of his death) it rose to 103.8° . He died comatose, and without convulsions. The condition of his retinae was not ascertained subsequently to the 11th of the month.

Autopsy.—The convolutions of the brain were flattened; the surface was dry and slightly congested, and the veins were engorged. The membranes at the base were thickened, and lymph was present in the subarachnoid tissue about the inter-peduncular space. There were a few miliary tubercles at the base of the brain, which were most abundant in the Sylvian fissures. In the right fissure, just by the anterior convolution of the island of Reil, the tubercles were aggregated into a small tumour. The corpora quadrigemina, and apparently these alone, were occupied by a globular cheesy mass, about as large as an ordinary marble. This lay between the upper surface of these bodies and the iter, and was invested above and below by a thin remnant of the normal textures. The position of the corpora quadrigemina, as seen from above, was occupied by a smooth rounded expansion, which was due to the presence of the tumour and the consequent effacement of the proper contours of the part. The lower part of the tumour was received into a cup-like depression of the structures below the level of the iter; the

latter passage being obliterated by pressure, and forming from before backwards the segment of the circumference of a circle, with the convexity facing downwards and forwards. The substance of the brain was generally healthy, but the lateral ventricles were distended to some extent with fluid.

With the exception that the pleuræ presented adhesions, that the lungs were thinly studded with grey tubercles, and that numerous larger yellow tubercles were scattered through the spleen, the abdominal and thoracic viscera were healthy.

CASE 2.—*Tumour of valve of Vieussens, involving cerebellum and corpora quadrigemina, and adherent to floor of fourth ventricle; similar growth in dura mater of base; blindness, optic neuritis, paralysis of ocular muscles, deafness, tremors of head and limbs, and loss of power in limbs; mental affection; discharge from right ear. Death. Autopsy.*

Lily M., a girl aged 20, was admitted under my care on April 4, 1882.

Two years ago the third finger of her left hand became weak (not flexed), so as to interfere seriously with pianoforte-playing, of which she was very fond, and at which she was clever. Later, she complained of dimness of the left eye, and deafness of the left ear, with sounds in it as of bells ringing. These symptoms persisted, and at the end of a year she began to see double. Five months later (seven months ago) she presented a manifest inward squint of the left eye. About this time, too, she began to experience difficulty in walking; there was some tremor in the legs, they occasionally crossed one another when she attempted to walk, and she had to grasp at things for support; and she complained of numbness in the left arm and leg. She also suffered from fatigue, required assistance in dressing, and looked pale and ill.

From Nov. 20 to Feb. 8, she was away from home; and there is no record of her symptoms, beyond the fact that she gradually got worse. When she returned, the arms, and head and neck, were tremulous as well as the legs; and the left eye turned outwards. Her sight and hearing also were more defective than they had been; she was so weak on her legs that she could not walk without assistance; her speech was affected; and she talked at times incoherently.

From this time she rapidly got worse. Early in February the catamenia ceased; about the same time she complained that she

was absolutely blind and deaf; and her talk was at times nonsensical and incoherent. She spoke in a drawling, whining tone; and talked constantly of herself, and in complaint of her blindness and deafness. She seemed not to recognise people, and was apt to give them new names, by which she continued to know them. She has generally recognised her mother, however. Her mother believes that she sees and hears, at any rate at times. Since January she has occasionally passed her evacuations in bed.

She is naturally of a gentle and affectionate disposition; and, excepting when (on one or two occasions) she has given way to temper, she has retained these qualities throughout her illness. She has never shown symptoms of hysteria, unless any of the above phenomena are to be regarded as hysterical; which was the view of those who sent her to the hospital.

The patient is a fair, well-nourished girl. She can walk with assistance in a shuffling way, but for the most part keeps her bed. She is blind and deaf, and speaks in a slow, drawling manner. She has marked tremors of the arms (like those of disseminated sclerosis) when she uses them, and of the head and neck when she sits or stands. The legs also tremble to some extent. There is no loss of feeling; indeed perhaps a little hyperæsthesia. The pupils are unequal, the left being larger than the right, and do not react to light. The eyes diverge; this appears to be due to an external squint of the right eye, the movements of which seem generally restricted. But it is difficult to be sure which ocular muscles are affected, inasmuch as the patient cannot see, and cannot hear so as to do what she is told. There is slight rotatory nystagmus of the left eye. Double optic neuritis is present: much swelling extending some distance from the disc, very tortuous and dilated veins, and several striated hæmorrhages. There is slight facial paralysis on the right side. She is constantly talking in a slow, whining fashion, mostly on matters that concern herself, and often asks questions, and to be kissed. If not gratified, she turns crossly on her right side. She does not try to do anything for herself; but if food be placed in her hand, she then puts it into her mouth. The legs and arms are all weak, but there is no definite paralysis. The patellar¹ and plantar reflexes are absent, and there is no ankle-clonus.

No affection of thoracic or abdominal viscera. Tongue clean. Appetite fair. Bowels confined. Urine pale, acid, no albumen. Temperature 99·2°.

¹ This is the effect of the only record as to this matter. I believe, however, the tendon reflexes were examined on subsequent occasions and found present.

During the next fortnight her symptoms accorded in the main with the above description. She occasionally got up; but generally lay in bed on her right side. She was very drowsy, and at times difficult to rouse. When awake, she was sometimes noisy, and called out for her mother. She seemed to know that she was left among strangers, but evidently did not know where she was. She often spoke of her condition of blindness and deafness, and of herself as the 'mad Miss M.' She evidently could not see or hear, as a general rule; but the sister and nurses believed that she could both see and hear imperfectly at times. It is certain, however, that her sense of touch was very acute; and any slight disturbance of the bedclothes, or bed, made her move or stretch her arms in its direction. If she caught hold of anyone's hand, she would grasp it and fondle it with both her hands, and press it to her bosom or carry it to her lips, and ask to be kissed. At the same time her face assumed an extremely affectionate, if not erotic, expression. She generally fed herself greedily when food was put into her hands. The tremors and the paralytic condition of the eyes remained unchanged. She never passed her evacuations into the bed. On the 19th a discharge took place for the first time from the right ear.

During the next month the symptoms, on the whole, remained much the same as they had been. See was still often drowsy, but at times was restless; on the whole, however, much quieter than she had been. She still talked somewhat incoherently at times, and in her slow plaintive manner; and evidently did not always know where she was, or who the persons were about her. She was still blind and deaf, and the movements of the eyes were more or less independent of one another. She remained acutely sensitive, however, and understood many things. Thus, she was still inclined to be affectionate, she still fed herself when food was put into her hands, and if she felt stockings being put on her feet, she knew she was to get up, and she assisted in the process. The tremulous condition of head and neck and arms, and in a less degree of the legs, continued. The discharge from her ear persisted. No further paralysis had been developed; but the weakness of the right seventh, which had been before observed, was still present. Her tongue was clean, her appetite good; she had no sickness; her bowels were regular; she passed her evacuations consciously; her temperature was normal; and she was habitually got out of bed and placed in an arm-chair some time or other during the day.

On May 21, her temperature rose unaccountably to 102.2° , and the next day to 103.2° . She became, perhaps, somewhat more drowsy than she had been; and the ear that had been discharging

presented at the meatus an unhealthy-looking sore. On the 25th it was noticed that she had lost power in her legs; and she moaned a great deal, as if in pain. In the evening she began to tremble violently, in arms, legs, head and neck, and trunk; but on the right side more than on the left. This continued for several hours. The temperature was then between 101° and 102° . On the 29th it was observed that the legs remained weak, so that she could not stand; that she choked a good deal when taking food; that the veins of the forehead and inner extremities of the eyelids (especially the latter) were greatly distended; that she seemed in pain, but was very quiet; and that her pulse was 92, very feeble and slightly irregular. She gradually sank from this time, and died at 5.15 on the morning of the 30th. Her temperature, which during the last ten days had varied a good deal, but on the whole had continued high, rose an hour before death to 105.4° .

It is noticeable that the patient never complained of giddiness, and was never sick; that her evacuations were always passed consciously; that she had no fits, unless the prolonged tremors which occurred a few days before death are to be regarded as a kind of fit; and that she had no pain in her head until shortly before her death.

Post-mortem Examination.—There was slight general congestion of the surface of the brain, with flattening of the convolutions and diminution of the subarachnoid fluid. The lateral ventricles were largely distended with fluid. The parts bounding these cavities were somewhat softened. Originating, apparently, in the valve of Vieussens was a soft, translucent, vascular new-growth, which extended into the neighbouring part of the cerebellum, mainly its middle lobe, and appeared to involve to some extent the corpora quadrigemina, which looked swollen and œdematous. It was adherent to the floor of the fourth ventricle, the ependyma of which was converted into a thick pulpy layer; but it did not appear to have encroached on the subjacent medulla. The growth altogether was perhaps about the size of a bantam-fowl's egg; but the limits between it and the nervous tissue, which it invaded, were very ill-defined. All other parts of the brain were healthy. Cord healthy.

Patches of dura mater, in both anterior fossæ, in both middle fossæ, and in a less degree in both posterior fossæ, were the seat of growths identical with that affecting the brain. They formed irregular tracts, were a line or two thick, soft, translucent, slightly adherent to the surface of the brain above, and had caused erosion and honeycombing of the subjacent bone-tissue. Some of the nerves issuing from the skull seemed to have been more or less pressed on by these growths; and it was believed that the affection

of the ear observed during life was due to the disease of the dura mater.

The neoplasm appeared to consist of small oval and fusiform cells and blood-vessels.

Thoracic and abdominal viscera all healthy.

CASE 3.—Tubercular mass in third ventricle involving both thalami and followed by tubercular meningitis.—Tremors and rigidity of arms and legs; drowsiness; irritability; optic neuritis; slight facial palsy. Convulsions, coma, and elevation of temperature coming on with the meningitis. Death. Autopsy.

Frederick P., aged 4, was admitted under Mr. Sydney Jones, for scrofulous disease of the left astragalus, which was excised on October 22, 1878. He went on very well until January 28, 1879, when tremulous movements were observed in the left arm and leg. These occurred only during the performance of voluntary movements, and consisted mainly in small to-and-fro movements at the larger joints, resembling those of disseminated sclerosis. There was slight loss of power in both of the affected limbs; but he could grasp with a fair amount of force. No other symptoms whatever, referrible to the nervous system, were present. The tremors continued, but it was noticed that they were more severe on some days than on others, and that they ceased during sleep. Early in March tremors first showed themselves in the right hand; and slight spasmodic movements were observed on the left side of the face. All these symptoms continued, with little or no material change, and without the development of any fresh ones, up to May 12, when he left the hospital.

He was re-admitted on July 8. He had rapidly got worse, in respect of his ankle, his nervous symptoms, and his general health; and latterly had become drowsy, and passed his evacuations unconsciously.

Face pale; a large distended vein runs transversely across the right upper eyelid. Very sleepy, and indeed seems always asleep, excepting when he is disturbed; and although his appetite is good, and he has no sickness, he never asks for food; but he eats ravenously all that is given him. He constantly falls asleep while taking his meals, and has to be roused for each mouthful. He does not seem to be in pain; but has general hyperæsthesia; is very peevish and irritable; and cries out when contradicted or disturbed. When nurses or others stand at his bedside, he attempts to ward them off with his right hand, and whines, 'No.'

The mouth is natural when at rest, but is much drawn to the right when he laughs or cries, while the right eye becomes partially closed, the left remaining open. No squint; pupils equal, dilated, responding to light. Commencing optic neuritis; veins tortuous, no hæmorrhages. Tongue protruded straight, tremulous. Speech slow, but otherwise natural. No deafness. Head retracted somewhat as he lies. There are rhythmical tremors of the right hand and arm and leg, which are excited only by voluntary movements, and cease during sleep. They are much more pronounced than when he left the hospital. The movements on the left side have ceased; and the limbs have become rigid; the left elbow-, wrist-, and finger-joints are strongly flexed. The finger-nails are digging into the palms; and great pain is caused by the attempt to straighten the fingers. He often rubs or scratches the right side of his face. No dysphagia or vomiting; bowels constipated; motions passed unconsciously. Temperature ranging from 99.4° to 101° . Pulse, 114. Respirations, 24.

During the next three months his condition varied little. He was drowsy; often seemed in pain; and was extremely irritable, crying out when pressed to answer a question. He could still see; but his sight was manifestly impaired, and he would apparently clutch at objects which did not exist. The tremors on the right side continued; and the left arm and leg remained rigid, and for the most part still. Slight tremors, however, were now and then observed in them. There was slight paralysis of the face on the left side, but none of the tongue or ocular muscles. He had no vomiting, and no fits; and no evidence of disease in the chest or abdomen was obtained.

On October 8 he became worse, and vomited twice; and his temperature next day rose to 103.2° .

On the 14th the following notes were taken. Has scarcely spoken a word since the 8th; and since the 10th his temperature has varied between 101.8° and 102.8° . Yesterday afternoon he seemed fairly well, could see, and recognised his mother. But at 10 P.M. it was observed that his left pupil was much larger than his right, and that he took no notice of anything placed in front of his eyes. At 4 A.M. this morning he got unconscious; the left limbs became extremely rigid and tremulous; he foamed at the mouth; his eyes were directed upwards to the left, and his eyelids were blinking. He was still in this condition at 10 A.M. He had not called out, and had taken no food. He remained unconscious during the rest of the day, lying with head strongly retracted, breathing stertorously, and having every few minutes attacks of rigidity,

affecting both arms and legs, but limbs of right side mainly. Drops of sweat collected on the face, and the right arm and leg became notably cold; but the temperature of the body rose to 103.2° . He was nable to swallow.

Death took place at 4 A.M. on the 15th.

The eyes were examined shortly before death, when the veins at the back of the left were found dilated and tortuous. The right presented recent ulceration of the cornea.

Post-mortem Examination.—Much emaciated; pupils of equal size. Old cicatrix over inner side of left ankle.

Meningeal vessels congested; pia mater on vertex natural; convolutions flattened. Interpeduncular space, pons, and medulla opaque and covered with flakes of recent lymph. A few miliary tubercles in membranes at base; and an abundance of them in the right fissure of Sylvius. Much distension of lateral ventricles with clear fluid. The third ventricle was occupied by an irregularly globular tubercular mass, about $1\frac{1}{2}$ inches in diameter, which partly involved both optic thalami. Another small tubercular mass was found on the internal surface of the left occipital lobe.

No tubercular or other disease was discovered either in the thoracic or in the abdominal viscera.

CASE 4.—*Tubercular mass in left lobe of cerebellum; effusion of fluid into ventricles; inability to walk; tremors of arms and head; optic neuritis and blindness; frequent epileptiform attacks; headache, &c. Death. Autopsy.*

A. G. T., a boy four years of age, came under my care on December 30, 1879. About three months before that time he was suffering from hooping-cough and measles, and then had several fits. About two months before admission the mother noticed that he squinted; the fits also became more frequent, and he began to complain of pain at the back of the head.

He is a plump, healthy-looking child; seems quite sensible; answers questions, but speaks indistinctly, and drawls out his words very slowly. He can move his legs, but is unable to walk, or even to stand. His hands and arms (especially the left) tremble when they are in use, and there is apparently want of co-ordinating power in them. His head and trunk also tremble when he sits up. He has no squint, and the pupils are dilated and equal. He appears to be completely blind. There is no definite paralysis, no impairment of sensation, and all the reflexes are well-marked. The pain in his head comes on in paroxysms, and is referred to the occipital

region; and when he is lifted up he screams out, and puts his hand to the back of his head. There are no signs of disease in the thoracic or abdominal organs. Tongue clean; appetite good; bowels confined; urine 1020, urates and phosphates, but no albumen.

His symptoms underwent very little change during the next few months. He remained sensible, but spoke slowly and with difficulty; he suffered at times from severe headache, which often made him cry out, but in the intervals he was remarkably good-tempered, and always ready to laugh; the weakness of the legs, and the tremors of his head and neck and arms, continued; and he passed his evacuations into the bed; he retained a fair appetite, and had no sickness. He had frequent fits, sometimes several in the day; the periods of insensibility varying from two minutes to a quarter of an hour. In some of them he was quite still, save for a little twitching of the eyes and eyelids, and turning in of the thumbs. In the more severe ones, the arms and legs became rigid, the former being raised above the head, the latter being straightened, with toes pointed; but the rigidity was more marked in the right than in the left arm, and the latter generally became limp during the progress of the attack. The fits were occasionally ushered in with a paroxysm of crying. On January 23 his eyes were examined by Mr. Nettleship, who reported that he thought the boy had perception of light with right eye, for he followed the mirror with it, and the pupil acted fairly to light; that the left pupil also acted, but irregularly; and that the last stage of optic neuritis (woolly discs), passing into atrophy, was present in both eyes, without hæmorrhage, or much swelling. His head was large, and it was suspected that it was increasing in size; its measurements were taken therefore early in March and again early in April; but no progressive change was discovered.

At the end of March, or the beginning of April, he began to suffer from drowsiness; and was becoming manifestly more and more feeble-minded; much less inclined to speak, and also much less inclined to laugh. Further, he often had, besides his stronger fits, apparently momentary attacks of loss of consciousness, and the limbs were often rigid. The surface was apt to become flushed. The tremors of the head and neck and arms continued. His appetite became impaired; and he had difficulty in swallowing, more especially solids.

During May he became very quiet, ceased to speak, often refused food, and it was observed that he did not close the left eye so perfectly as the right, and that it presented a slight internal squint.

There was no doubt that he was now quite blind; and the pupils, which were equal and dilated, did not respond to light. His face was now without expression. The circulation was very imperfect, and the hands were cold and livid. He had become very thin.

During the next two months he passed mainly a vegetative existence. He lay almost unconscious, occasionally moaning, but never speaking, though even to the last apt to present a flickering smile when tickled. His arms became more or less permanently stiff, and in great measure ceased to tremble. Late in June it was observed that the left conjunctiva was insensible, and that an ulcer had appeared on the cornea. This proceeded to perforation and prolapse of iris, which took place about July 14; at which time an ulcer had appeared on the right cornea also. It may be added that early in June some vesicles made their appearance on the cheeks and forehead, which subsequently became pustular, and that one of them reached the size of a shilling. He vomited once or twice during the month of July. His death had been anticipated daily, for weeks before it actually occurred on August 6, and was due apparently to a combination of coma and asthenia.

Post-mortem Examination.—Much emaciated; head very large, anterior fontanelle slightly open.

Surface of brain dry; convolutions flattened. The ventricles were greatly distended, containing about two pints of watery fluid. The brain generally was soft, but otherwise healthy. A small tubercular mass was embedded in the grey matter of the orbital surface of the right frontal lobe; and another mass of similar nature, and about the size of a Tangerine orange, occupied nearly the whole of the left lobe of the cerebellum. The brain-tissue around was softened, and the part in contact with the tentorium was adherent to it. The part of the left cerebral hemisphere that was in contact with the diseased cerebellum was superficially softened. And the corresponding sides of the pons Varolii and medulla oblongata were pressed upon and somewhat softened. There was no evidence of implication of the ganglia at the base of the brain. The optic nerves, especially the left, were small. Heart and pericardium healthy. Lungs collapsed below, but otherwise pale and healthy. Glands at root caseous. Chylopoietic viscera healthy. Some pyelitis of both kidneys, with a few small dark-yellow concretions.

CASE 5.—*Chronic hydrocephalus; dropsical accumulations in lateral and third ventricles, in fourth ventricle, and in central spinal canal; weakness of intellect; stiffness of neck; feeble, tottering gait; epileptiform fits. Death. Autopsy.*

B.S., a harness-maker, aged 17, was admitted under my care on June 8, 1872.

He was said to have been a healthy lad until about four months ago, when he began to complain of pain in his back when at work, of headache and nausea. Three months ago, while at church, he was seized suddenly with pain in his back and head, and giddiness so severe that unless he had been supported he would have fallen. From this time the pain in his head was so intense and constant that he was compelled to give up his employment. He remained in this condition up to three weeks ago, when he had three epileptic fits. On June 8 he had two others, but did not lose consciousness in them; and for a short time subsequently he had no use of his right side. Since his illness he has suffered from constipation, and has occasionally seen double.

He is a well-grown, but dull, heavy-looking, large-headed youth; apparently slow of intellect and speech, and slow and unsteady in his movements, yet with no definite paralysis. He has no discoverable disease of the thoracic or abdominal organs. Pulse 84. Temperature 98.6°. Urine 1008, free from albumen.

While he was under observation in the hospital, the following circumstances were noted. The patient has no paralysis of any of his voluntary muscles, and no affection of his tactile or other senses. And he has complete control over his rectum and bladder. But his neck seems stiff, and he has manifest difficulty in rotating his head from side to side, and upwards and downwards; he walks feebly and unsteadily, and with a shuffling gait. His mental condition is peculiar; and gives the impression of slight congenital imbecility, which, however, is denied by the friends. While in the hospital, he was occasionally noisy at night-time.

On the 22nd he had a fit. On the 28th he complained more than he had previously done of headache. During the night of the 29th he was more noisy than he had been; but otherwise seemed much in the same state as usual. Early in the morning of the 30th he became suddenly livid in the face and insensible, and died without any convulsions in the course of a few minutes.

Autopsy.—Head 23 inches in circumference externally. Skull very thin, especially near sutures, and distinctly marked by convolu-

tions. Dura mater healthy. Pia mater injected. Surface of brain dry; convolutions flattened, and fissures almost obliterated. The infundibulum was much distended with fluid; and on removing the brain, clear colourless fluid poured away from this part. The basal portion of the brain, from the crura cerebri to (and including) the lamina cinerea, was stretched and tense, owing to dropsy of the ventricle, and not thicker than paper. The fourth ventricle also was distended with fluid, and its lateral margins formed on either side a saccular projection just behind the crus cerebri.

On laying open the lateral ventricles, they were found to be largely and uniformly dilated. Many ounces of fluid had escaped, but several still remained. The communication between them, and between them and the third ventricle, was very free. No septum lucidum, properly speaking, could be found; and the fifth ventricle appeared to be represented by a triangular prolongation of the third ventricle forwards. The corpora striata and optic thalami of the two sides were widely separated by the large and distended third ventricle. The commencement of the iter was quite blocked up by a translucent septum, looking like a portion of the ependyma. The testes and nates and roof of the iter were together much widened, bulged upwards and very thin, evidently from distension of the iter with fluid. The valve of Vieussens and processus e cerebello ad testes were convex and tense, forming a fluctuating tumour, which was continuous with the projections observed behind the crura cerebri. The pons itself looked normal. The fourth ventricle and iter formed a common cyst, isolated from all other cavities. The substance of the cerebrum, cerebellum, and other parts of the brain, was of normal consistence and texture. The lining membrane of the ventricles was somewhat thickened.

The medulla oblongata and the first six inches of the spinal canal were much enlarged, leaving scarcely any space for subarachnoid fluid. This was due to dilatation of the central canal, which was full of serous fluid. There was no communication above between this and the fourth ventricle; and below, the central canal became, as in the normal condition, inconspicuous.

There was no inflammation, tubercle, or new-growth of any kind. The nerves at the base of the brain appeared all healthy.

The weight of the brain, including the fluid (perhaps an ounce) in the fourth ventricle, was $66\frac{1}{2}$ oz.

All the other viscera were healthy.

XXI.

ON SOFTENING OF THE PONS, CRURA CEREBRI,
AND NEIGHBOURING PARTS.¹

THE cases to which I wish to call attention present, each of them, individual points of interest; but doubtless their chief value resides in the fact that they have a close pathological and clinical relationship. They are all of them cases of softening of the pons Varolii, crus cerebri, or adjacent parts. The symptoms were in all cases those of what is roughly termed cross paralysis, and in every instance the affection was ushered in by premonitory symptoms. The symptoms, however, presented considerable differences of detail, and there were differences as regards etiology.

The first case was that of a young man who had contracted a chancre exactly six months before his death, and who was suffering from secondary symptoms in the form of psoriasis at the time when his fatal illness seized him. The symptoms of this illness began five or six weeks before he died (and certainly therefore within five months of his syphilitic inoculation) with occipital headache and sickness. After three or four weeks, or, more exactly, fourteen days before his death, he began to ramble a little in his mind and to be troublesome; and the next morning it was noticed that his pupils were contracted, his conjunctivæ were congested, and his left eyelid drooped slightly. Five days later, when he woke in the morning, he was found to be hemiplegic on the left side; and after another four days it was noticed not only that the left eyelid drooped a little, but that there was paralysis of all the muscles of the right eye, excepting probably the superior oblique. Meanwhile the patient was

¹ *Lancet*, July 1883 (with additions).

becoming more and more drowsy and stupid, and he died quietly on the fourth day after the paralysis of the muscles of the right eye had declared itself. Syphilitic disease of the internal organs generally arises as a part of the so-called 'tertiary symptoms' of syphilis, and therefore late in the progress of the disease, and often after many years have elapsed. Still, as the patient here appeared to have been in all other respects a healthy man, it was assumed during life that his cerebral affection was syphilitic, and he was treated accordingly. Further, it was not difficult to speculate, from the symptoms, as to whereabouts the cerebral lesion would be found. The left-sided hemiplegia pointed to involvement of the motor tract, issuing from the right hemisphere of the brain; and that the part directly implicated was the right crus cerebri or the contiguous portion of the pons had been foreshadowed by the slight ptosis observed in the left upper eyelid. This surmise was confirmed when, a few days subsequently to the occurrence of hemiplegia, total paralysis of the right third nerve was added to the other phenomena. At the post-mortem examination there was found syphilitic thickening, with obstruction, of the right posterior cerebral artery, and consequent softening, with more or less disintegration in patches, of the right crus cerebri, and of some of the neighbouring parts to which this artery is distributed. The paralysis of the right sixth was no doubt due to the thickening of the membranes observed at the base of the brain, and the very partial affection of the left third was probably connected with some special but concurrent lesion of that nerve. It may be assumed that the patient's early and comparatively vague cerebral symptoms were due to the disease of the arterial walls and slight associated inflammation of the membranes in the neighbourhood; that the hemiplegia took place when the channel of the posterior cerebral became suddenly occluded; and that the right third nerve got involved as the area of softening extended.

The second case was also that of a young man who had somewhat recently contracted syphilis, but who gave no history of having suffered from secondary symptoms. The duration of his fatal illness was between four and five weeks.

For three weeks he complained of frontal headache, unattended with sickness or other important symptoms, at the end of which time he was seized during the night with almost complete left hemiplegia, associated with rigidity of the arm and leg, inability to speak, and well-marked paralysis of the third nerve on the same side. On the next day he had attacks of partial unconsciousness, during which the head and eyes were strongly turned to the left. On the following day he manifested some return of the power of articulation, and was evidently not aphasic. All signs of paralysis of the left third, seventh, and ninth nerves had disappeared, and the paralysed arm and leg had become limp. Three days later the urine, which from the beginning had had to be drawn off with a catheter, had become alkaline and offensive, and there were manifest signs of cystitis; and on that day his temperature reached 103.4° . After this the pulse increased in frequency, the temperature rose irregularly, and on one occasion he had a prolonged rigor; there was a slight return of the paralysis of the left third, seventh, and ninth, and the left arm and leg again got rigid; he passed into a state of coma, and at the time of death the temperature in his axilla had risen to 109.2° . In this case, as in the former, there was reason to suspect the presence of some syphilitic lesion of the brain, and the sudden occurrence of left hemiplegia during its progress pointed to the direct and sudden involvement of the motor tract in, or issuing from, the right cerebral hemisphere. The partial paralysis of the third nerve on the same side as the hemiplegia seemed to show that the lesion was situated somewhere about the crus cerebri or pons; and that the pons was the actual seat of disease was to some extent confirmed by the attacks of partial unconsciousness, with turning of the head and conjugate deviation of the eyes towards the paralysed side, which occurred on the second day of his hemiplegia. It will be recollected that deviation of the eyes and head in cases of cerebral disease is towards the lesion and away from the paralysed side, while it has been observed that, at any rate occasionally, when such deviation shows itself in affections of the pons the direction of the deviation is reversed. The post-mortem examination to some extent confirmed the

inferences that might have been, and in a measure were, drawn from the symptoms. There was syphilitic disease of the posterior cerebral and of some of the smaller arteries in the neighbourhood; and there was pulpy softening of the right half of the pons. No distinct occlusion of vessels was discovered; but there can be little doubt, I think, that the breaking down of tissue, which was exactly of the same kind as in the former case, and such as one meets with when arteries are obstructed, was the result of obstruction of the small arteries distributed to the softened region.

In this case, as in the other, the cause of the partial paralysis of the third nerve on the same side as the hemiplegia is not clearly explained by the obvious position of the lesion. But the difficulty of articulation which the patient manifested, and the retention of urine with tendency to rapid inflammation of the bladder, had doubtless some relation to the seat of disease. The extremely high temperature which was reached on the approach of death is a noteworthy feature in the case.

The third case was that of a man of middle age who was said to have been temperate and healthy, and never to have had syphilis. His illness began about twelve weeks before death, of which the last seven weeks and a half were spent in hospital. The onset seems to have been a kind of rigor; on which followed persistent headache and giddiness. The first definite sign of brain-disease was the occurrence of double vision four days before admission; and the second, left hemiplegia, which supervened on the morning of admission. When he came under observation it was found that he had partial paralysis of the right external rectus, and nystagmus of the right eye when trying to look to the right, incomplete left hemiplegia, and unsteadiness of gait. He rapidly got worse, and after four or five days it was observed that his intelligence had become affected, and that he was emotional, that his hemiplegia had become more complete, that the left internal rectus as well as the right external rectus was paralysed, and that all movements of the eyeballs, excepting that to the left, were attended with nystagmus. He had no optic neuritis. During the following two or three weeks the

symptoms underwent little change ; but about three or four weeks before his death partial paralysis of the right seventh and ninth was observed for the first time, and he presented also some difficulty of speech and of swallowing. There was no manifest increase of paralysis after this ; but he gradually became more and more feeble-minded, and at length comatose. Before death his temperature rose to 103.2° , his pulse to 160, and his respirations to 72 in the minute. In this case there was no evidence of syphilis ; but the occurrence of paralysis of the right external rectus with left hemiplegia pointed pretty clearly to mischief about the pons, right crus, or the immediate neighbourhood of these parts. And this inference was confirmed when, later, paralysis of the left internal rectus, and still later partial paralysis of the seventh and ninth nerves on the right side, and difficulty of speech and deglutition, supervened. The post-mortem examination revealed softening in almost exactly the same situation as in the first case. There was only a little atheroma in the vessels at the base of the brain ; there was no sign of syphilitic disease, and no recognised obstruction of vessels. The softening, however, was in the domain of the right posterior cerebral artery, and, as there was no trace of present or bygone hæmorrhage, it seems probable, at least to me, that the softening was the consequence of thrombosis of some of the smaller branches of the artery just named. It is not easy to understand from the post-mortem facts of the case the cause of the paralysis of the left internal rectus or of the right seventh and ninth nerves. It is noticeable that in this case there was nystagmus, and that in it, as in the last, there was considerable rise of temperature as death approached.

The fourth case occurred in the practice of my colleague, Dr. Stone. It was one of thrombotic plugging of the anterior part of the basilar artery, followed by softening of the corresponding region of the pons. The limits of the softening are not defined with precision in the post-mortem record, but the symptoms were those of interruption of the motor tract on the right side, together with much impairment of articulation. It is curious that scarcely any symptoms were present in this case to indicate the exact seat of mischief. It is probable,

however, that paralysis of one or other of the cerebral nerves would have appeared had not the patient's life been cut short by his pulmonary complication.

The fifth case was that of an elderly married woman. She had been out of health for two months, when she was suddenly taken in a fit, on emergence from which she appeared to be quite sensible, but was unable to articulate, was incompletely paralysed on the left side, and presented conjugate deviation of the eyes towards the left, with contracted equal pupils. The case in most respects presented the characters of ordinary left-sided hemiplegia due to hæmorrhage or softening; but the deviation of the eyes towards the paralysed side suggested that the lesion causing paralysis was in or about the pons, and not in the right hemisphere. The patient continued in much the same state until her death, which took place on the third day. But it was noticed, in addition, that her tongue was protruded straight, that she could not articulate, that she had no anæsthesia, that the conjugate deviation of the eyes persisted (although with an effort she could bring them almost to the middle line, at which time nystagmus was developed in the left eye), that her respirations were rapid and her pulse variable, that her temperature ranged from 98.4° to 104.4° , and that she was conscious to the last. After death there were discovered some old and a few recent tubercles in the lungs, some old disease of the mitral valve, with a small area of deep excavation in one of the cusps, and a region of softening occupying the middle half of the right side of the pons Varolii, together with a smaller patch of the same kind in the left side. No diseased cerebral vessels were discovered.

In this instance it is reasonable to suppose that the softening was the result of embolism. The suspicion suggested itself that the recent excavation in the mitral valve had been due to tubercular inoculation from the tuberculous lung; but no bacilli were detected. Here, as in the second case, there was conjugate deviation of the eyes towards the paralysed side; and, as in the third case, nystagmus.

The last case occurred in a middle-aged man. After suffering for a fortnight from headache and other symptoms, he

had an epileptic seizure, followed by loss of speech, paralysis of lower part of left side of face, and of right third nerve, with unequal and motionless pupils, and spasmodic twitching in left arm and leg and of both superior oblique muscles. There was also conjugate deviation of the eyes to the right. There was no discoverable anæsthesia, and no obvious paralysis of the left side of the body. He only lived 14 hours after his fit; and, before death his pulse rose to 168 and his respirations to 44 in the minute, and his temperature to 106.2° . At the post-mortem examination there were found incomplete plugging of the posterior part of the basilar, and of the posterior communicating arteries, and slight softening with yellowish discoloration of the posterior part of the caudate nucleus, nearly all the thalamus, and the posterior third of the internal capsule, all on the right side.

The softening here was obviously consequent on thrombosis. It will be noticed that in this case, as in some of the others, there was conjugate deviation of the eyes, nystagmus, and before death hyperpyrexia. It is interesting that, notwithstanding the presence of softening of the optic thalamus and internal capsule, there was no apparent loss of sensibility on the opposite side of the body. But there was twitching of the arm and leg, and there had been pain in the leg.

Before proceeding to the detailed account of my cases there are a few points of interest in connexion with them, mainly as a group, to which I may briefly refer.

1st. In no case was there any obvious impairment of common sensation or involvement of any of the nerves of special sense.

2nd. In no case did the patient suffer from convulsions. In one, however, there were, for one day, attacks of partial unconsciousness, attended with deviation of the head and eyes towards the paralysed side.

3rd. There was absence of optic neuritis in my fifth case, and also, at any rate during a considerable period of the patient's illness, in my third case, and I believe the same fact was observed in the second, but the record of it has not been preserved.

4th. The affection of the motor nerves at the base of the

brain was different in the different cases, and varied to some extent even in the same case; and, moreover, the paralysis was by no means generally most pronounced in those nerves which, judging from the seat of obvious lesion, might have been expected to be the chief sufferers. Several explanations of this phenomenon suggest themselves. Thus, the primary embarrassment of circulation may have involved a wider area than the subsequent softening, and nerve-nuclei at first implicated may have become reinstated; or again, when necrosial softening had involved a certain district, it may either have extended or, acting as a foreign body, have excited inflammation in the circumambient parts, and so have brought additional nerve-nuclei within its influence; and further, it is well known that most of the motor nerves at the base of the brain, and more especially, perhaps, the sixth, are liable to be interfered with either by the effects of basal meningitis, or by direct pressure exerted by a superincumbent tumour or swelling. The cases show, however, that, valuable as paralyses of these nerves are as a guide to us in the diagnosis of the seat of intracranial lesions, their indications require to be read with care, and we cannot safely attach specific value to them indiscriminately. It may be added that in one of my cases there was paralysis of the right external rectus, which might have been expected from the seat of lesion, and also of the left internal rectus, of which the cause was not apparent. It seems probable that in this instance there was implication of the centre, which coördinates the actions of these muscles. The 6th case was probably an example of the same phenomenon.

5th. The presence of deviation of the head, and of conjugate deviation of the eyes towards the paralysed side of the body has already been referred to, as occurring in one of my cases during attacks of partial unconsciousness; it was persistently present in my fifth case; and it is interesting that in yet other two cases there were, if not true conjugate deviation of the eyes, at any rate conjugate deviation determined mainly by direct paralysis of certain ocular muscles. Thus, in my third case, there was at an early period paralysis of the 6th nerve on the unparalysed side of the body, in-

ducing deviation of the eye towards the paralysed side; and this condition was followed later apparently by paralysis of the internal rectus of the opposite eye, at any rate by deviation of both eyes in the same direction. And in my last case, there was manifest paralysis of all branches of the third nerve on the side on which the lesion of the brain was situated, with deviation of the eye towards the opposite side of the body; and the opposite eye looked as nearly as possible in the same direction. In neither of these cases was there deviation of the head; and it is not improbable that the enforced deviation of the paralysed eye, determined, in each case, the deviation of its fellow.

6th. In three cases there was nystagmus, or something like nystagmus; and it is interesting that this phenomenon was observed only in the three cases in which conjugate deviation of the eyes was present. In Case 3, in which the right external rectus and the left internal rectus were paralysed, when the patient tried to look to the right there was horizontal nystagmus of the right, and vertical nystagmus of the left; when he looked upwards or downwards both eyes oscillated vertically; when he looked to the left the movements ceased. In Case 5, in which there was deviation of the eyes and head to the left, nystagmus occurred only in the left eye, and only when the attempt was made to look towards the right. In Case 6, in which there was distinct paralysis of the right third nerve, and deviation of both eyes to the right, slight oscillating movements were present in both eyes, due, as far as could be made out, to the action of the superior oblique muscles.

7th. The temperature in all cases was variable; and in two it rose rapidly with the approach of death. In one, where there was softening of the pons and one of the temporo-sphenoidal lobes, the temperature reached 109.2° ; in the other, in which the softening was of the optic thalamus, hinder extremity of the caudate nucleus, and posterior third of the internal capsule, the temperature rose to 106.2° .

CASE 1.—*Secondary syphilis ; disease of right posterior cerebral artery and softening of right crus cerebri, optic thalamus, &c. ; left hemiplegia ; paralysis of right ocular muscles.*

F. M. W. B., aged thirty-three, an attendant at a lunatic asylum, was admitted on April 16, 1872. It was stated that he had had primary syphilis in the previous October, and that this had been followed by sore-throat and psoriasis. He had been treated for his complaint, I believe, with iodide of potassium and mercury, and under the influence of treatment his symptoms had gradually subsided, but not disappeared. In all other respects his health had been good up to three or four weeks before admission. He then complained of headache, chiefly occipital, which was followed in a week or ten days by vomiting, coming on for the most part directly or very shortly after meals. These symptoms have been persistent since their first appearance. He has had no pain in the chest or between the shoulders, either after food or at any other time, but his appetite has been bad and his bowels constipated. He has had no cough.

On admission he was still complaining of occipital headache ; his tongue was thickly coated, but no disease of any important organ could be detected. The heart- and lung-sounds were healthy, the urine free from albumen, and with a specific gravity of 1027. The limbs, trunk, and especially the face, presented abundant traces of syphilitic psoriasis.

17th.—Has slept badly, but has not been sick ; has had much headache. There is no affection of any of the organs of sense, and he is perfectly rational. Tongue very thickly coated, white. Pulse, 52 ; temperature, 99° ; bowels not open.

18th.—Seems better, but has much headache, and slept badly. Temperature 99°.

20th.—Has twice been sick since the last visit, has slept badly, and has rambled a little both day and night. Last night he got out of bed and tried to get into one on the opposite side of the ward, and he threw a spoon at the nurse. He speaks quite rationally when answering questions, but does not know where he is, and rambles a little when left to himself. He complains very much of headache, which appears to be general. He can see with both eyes, but complains of muscæ. Both pupils are contracted, but the right is most so, and seems to act less perfectly than the other. Both conjunctivæ are congested, especially the left. The muscles of the eyeballs act normally, but the left upper eyelid seems a little dropped

Tongue less thickly coated than it was; appetite bad; pulse 50. No indications of thoracic mischief, or of renal affection.

24th.—No material change. He had thirty grains of chloral hydrate last night, slept well, and is very drowsy this morning. Says he feels better, but that his head is painful. Tongue much furred; bowels confined; pulse 54.

25th.—Had a tolerably quiet night, but this morning it was noticed that he had paralysis of the left side of the body. Neither himself nor the nurse could give any account of its coming on. He cannot now move arm or leg; but sensation appears to be unimpaired in them, and reflex movements are readily excited. The mouth is drawn to the right, and the tongue deviates slightly to the left. There is no change for the worse in any of his organs of sense. He is fairly sensible, and answers questions pretty readily. Complains of pain across forehead, in back of head, and in neck. Pulse 68.

27th.—Has slept pretty well the last night or two. Complains of headache still. Paralysis continues unchanged. Has had no sickness lately, and the bowels have been confined since the 25th, since when he has passed his urine into the bed. Conjunctivæ congested; pupils contracted. Tongue furred. Pulse 56.

29th.—No improvement. Is certainly more dull and stupid than he was. The tongue still distinctly deviates to the left. There is no change in the condition of his pupils, but their axes now do not correspond. The left eye seems to move freely and perfectly; but the right moves neither upwards, nor inwards, nor outwards; the only movement which it executes is downwards, with an inclination to the right.

May 1st.—Now takes no notice of anything that is said to him. The left upper eyelid droops more than the right; but the muscles of the right eye are paralysed. The pupils are equal and somewhat contracted. He does not appear to see. Water passed into the bed. Pulse 60.

2nd.—Was very quiet all last night, and now takes no notice whatever, however loudly he is addressed. He lies on his back with the eyes closed, and when the lids are raised the right eye is seen to be directed straight forwards, the left pointing downwards and to the left. The former is quite motionless, but the left is occasionally brought into the same position as the right. He does not follow or appear to notice the light of a candle, however near it is brought to the eyes, nor does the light affect the pupils, which are as nearly equal as possible, and somewhat dilated. He breathes gently and noiselessly, and occasionally rubs his eyes with his right hand.

He has had no convulsive attacks. Pulse 96. The syphilitic eruption has improved since admission, but is still quite apparent. His death took place next morning.

Autopsy.—There is slight thickening of the membranes at the base of the brain, but no noticeable flattening or congestion of the general surface. The right posterior cerebral artery for about an inch of its length is considerably thickened and slightly translucent, and the channel of the vessel, which is much narrowed, is occluded by a tough, adherent, cylindrical, fibrinous coagulum. All the other vessels are healthy. A tract of softening involves the right crus cerebri, the outer part of the right optic thalamus and internal capsule, and the brain-substance to the outer side of the hippocampus major; and patches of disintegration are present in each of these situations. The third nerve of the left side is enlarged. There is a great deal of effusion into the lateral ventricles. All other parts of the brain are healthy. Thoracic and abdominal viscera all healthy. No syphilitic disease of any of these organs.

CASE 2.—*Acute softening of right half of pons Varolii; left hemiplegia; partial paralysis of left third nerve, &c.; coma and great rise of temperature before death.*

James P., a gardener, aged twenty-seven, came under my care on December 24, 1881. Has been of loose habits and has drunk a good deal, and about two years ago had an attack of syphilis. Has had no other illness of importance. For three weeks he has complained of pain in the frontal region, which has become more severe during the last two days, and has been attended with loss of appetite; no sickness. He went to bed on the night of the 23rd fairly well but for his persistent headache. At 5.30 the next morning his brother found him lying on the floor, and thought he was drunk; he was partially insensible, and when he was being replaced in bed the brother noticed that he struggled only with one side. He was admitted into the hospital a few hours afterwards. At that time he was partially unconscious; the pupils were dilated and equal; there was an external squint of the left eye, and ptosis of the left eyelid; the upward movement of this eye also was a little impaired; the mouth appeared to be drawn slightly to the right, and the tongue was protruded markedly to the left; he was unable to speak, but seemed to understand what was said to him, and complained of pain in the frontal region; no difficulty of swallowing; the left arm was flexed at the elbow and lay across the

chest, and the hand also was closed ; the whole limb was rigid and completely paralysed ; the left leg also was rigid, but extended, and he retained slight power over the movement of the toes ; the patellar reflex was brisk in both legs, but chiefly in the left ; no ankle-clonus ; plantar reflex almost absent on the left side ; left leg colder than the right ; no loss or impairment of sensation ; thoracic and abdominal viscera healthy. Pulse 90.

25th.—Was very restless during the night, and to-day is much the same as yesterday ; paralytic phenomena remain unchanged ; he is unable to speak, but evidently understands what is said to him ; the water has to be drawn off ; he has had occasional attacks of increased, but still incomplete, unconsciousness, during which the head and both eyes were turned strongly to the left.

26th.—Still very restless. He begins to speak, though indistinctly, and is evidently not aphasic. The paralysis of the left third has almost wholly disappeared, and the suspected paralysis of the other muscles of the face is not noticeable. The left arm and leg are fully as powerless as they were, but they are now limp. Superficial and deep reflexes increased on left side. Urine still has to be drawn off ; specific gravity 1028, no albumen.

29th.—The patient has been very restless ; has suffered from much pain in the bladder, and the urine has become offensive and alkaline. The bladder has consequently been washed out. The temperature, which ever since admission has varied between 99° and 100.2° , began to rise on the morning of the 28th, and this morning early reached 103.4° ; tongue dry.

31st.—The restlessness and severe pain in the vesical region have continued ; but the urine, which still has to be drawn off, has ceased to be offensive, and has become slightly acid, and contains no trace of albumen. The temperature rose to 104.9° last night, when he had a rigor of twenty minutes' duration. This afternoon it reached 105.2° without the occurrence of a rigor ; tongue dry ; no rigidity of limbs ; speech as before.

Jan. 2nd, 1882.—Still restless and in pain ; complains also of pain in the right side of the head and down the left arm ; is quite sensible, and occasionally cries out. The limbs are rigid again, and since yesterday there has been slight ptosis of the left eyelid, and protrusion of tongue to left. The condition of the facial muscles is doubtful ; tongue dry and brown ; much vomiting ; obstinate constipation ; pulse 116. The temperature on the 1st fell from 103.2° in the early morning to 98.2° at noon ; it subsequently rose again, and during the later part of this day and the 2nd varied from 97.8° to 101.4° . A bed sore on left buttock.

3rd.—Much quieter and almost unconscious. Both pupils much dilated, especially left; pulse 132; respirations noisy, 48 in the minute. Tongue very dry; paralytic symptoms unchanged; temperature varying between 100.8° and 103.5° .

4th.—When seen this morning he was fast sinking and wholly unconscious. He died at noon. His temperature rose rapidly before death. At 11 it was 106.6° ; at 11.30, 107.1° , and at the time of death, 109.2° ; half an hour later it was 108.4° .

Autopsy.—Vessels of pia mater injected, but no trace of meningitis, and nothing abnormal as regards the form of the general surface of the brain, or the subarachnoid fluid. The posterior cerebral and some of the smaller arteries in the neighbourhood were much thickened, yellowish and opaque, apparently the seat of syphilitic disease. But the other and larger vessels were fairly healthy. There was slight comparative softening of the left temporo-sphenoidal lobe; and the pons, which was somewhat swollen, was soft and semi-fluctuating. On incising this part an irregular patch of broken-down brain-substance occupied the greater part of its right half, being separated from the surface, and from the surrounding healthy substance, by a zone of congested and apparently inflamed tissue. The substance of the temporo-sphenoidal lobe appeared fairly healthy. The rest of the brain-substance was normal. There was, perhaps, a slight excess of fluid in the ventricles. A few old pleural adhesions. Lungs congested and cedematous below. Larger bronchi full of muco-purulent fluid. Pericardium and heart healthy. The abdominal viscera presented nothing unusual. Kidneys rather large and pale. No syphilitic affection of any of these organs.

CASE 3.—*Softening of right crus cerebri and lenticular nucleus; left hemiplegia; paralysis of right external and left internal rectus, and, later, of right facial and right hypoglossal nerves; nystagmus; giddiness; headache; emotional and mental disturbance.*

H. T., a labourer, aged forty-six, came under my care on December 11, 1879. He has been a temperate and healthy man, and has had no important illness since childhood. Never had syphilis. His illness began early in November with a sense of coldness and shivering, which were not relieved by sitting in front of the fire. The next day he first complained of giddiness, and a feeling as if he were drunk. The giddiness, which continued, was most marked in the morning, and was always relieved by lying down. He further complained of pain on the right side of neck

behind, and also across the backs of both eyes. He has had no nausea or sickness. On Dec. 7 he began to see double, and on the day of admission he first noticed that his left arm was weak, and his leg dragged.

He is a well-nourished man. He is quite sensible, and complains of constant headache, liable to exacerbations of a shooting character, and referred mainly to the back of the right ear and the occiput. He is very unsteady in his gait, and inclined to fall over, but not to one side more than to the other. Can stand with eyes shut when legs are kept apart, but not when feet touch. The movements of both legs are somewhat ataxic; patellar reflexes slight. His left leg is somewhat weaker than the right, and the left hand grasps much more feebly than its fellow, and cannot be raised above his head. There is marked weakness of the muscles of the lower part of the face on the left side. The pupils are equal, and respond to light, and there is no very obvious squint. But he complains of seeing double, especially when he looks to the right. In trying to turn his eyes to the right, the right eye lags a little and oscillates. The movements of the left seem quite natural. Optic discs healthy. Tongue protruded straight. No loss of cutaneous sensibility or of control over rectum or bladder. No defect of speech. There are no signs of thoracic or abdominal disease; and the urine is free from albumen and healthy.

During the next few days the patient rapidly got worse; he became restless and troublesome, and rambled; he grew emotional, but usually disposed to cry; he lost control over his bladder; his arm became much more enfeebled, and he could do little more than move the fingers; the paralysis of the left side of the face got confirmed, and his tongue was protruded to the left; he still complained of headache, mainly in the right occipital region, and the movements of the eyes became more defective. They were carefully examined on the 16th by Mr. Nettleship, who reported as follows:—‘There is diplopia when patient looks to the right, but not to left. The movement of the right eye outwards is defective, and efforts to effect it always cause rapid horizontal nystagmus. The left eye cannot be moved inwards beyond the middle line, and the attempt to move it in this direction always causes vertical nystagmus, which is much slower than the nystagmus in the right eye. Both eyes can be freely moved upwards and downwards, but these movements are attended with vertical nystagmus. The only movement of the eyes unattended with nystagmus is that to the left. There is paralysis of the left internal rectus, and in a less degree of the right external rectus. There is no optic neuritis.’ He remained in much the same state

for the next two or three weeks; emotional, rambling, and complaining of pain and sometimes tenderness at vertex; but the paralysis of the left internal rectus diminished somewhat, and, on the whole, the weakness of the left arm also diminished. The left pupil became larger than the right. On Jan. 6 it was noticed for the first time that the right side of the face was smoother than the left; that the right eye did not close so perfectly as the other; that the tongue, which hitherto inclined slightly to the left when put out, now protruded distinctly to the right; that he talked with difficulty, and that he had some difficulty in swallowing. From this time he gradually became more and more feeble-minded and more and more prostrate, without any material change or aggravation in the paralytic symptoms. On Jan. 31, special note was made of the presence of difficulty of deglutition and of stertorous breathing. On the morning of Feb. 1 his temperature for the first time exceeded the normal. At this time he became comatose, with stertorous breathing, his respirations being 72 in the minute; his pulse was 160; his temperature 102.7° , and his skin was damp. In the course of the day his temperature rose to 103.2° , and he died at seven that evening.

Autopsy.—Dura mater and skull healthy; arachnoid and sub-arachnoid tissue somewhat opaque, with patches of fibroid thickening; slight atheroma of vessels at base. The only lesion discovered in the brain was a patch of softening, with yellow discolouration, which involved the right crus cerebri and the right lenticular nucleus. The surface of the crus looked healthy; and no marks of disease were apparent in the walls of the ventricles. The nerves at the base looked healthy. There was some congestion and lobular pneumonia at the bases of the lungs. No other lesion was discovered.

CASE 4.—*Thrombosis of basilar artery; softening of anterior part of pons; left hemiplegia. Death from bronchitis.*

John B., a labourer, aged thirty, was admitted, under Dr. Stone, on March 16, 1882. He is said to have been a temperate man, and to have had no previous illness; previously, however, he must have suffered for some time with bronchitic symptoms. He was taken ill five days ago, while at work, with giddiness. He was not sick, and did not fall down; and, indeed, was able to walk home unassisted. After reaching his home he gradually lost power in the left arm and leg, and also his speech, which, however, has improved since.

He is a fairly healthy-looking man, but hemiplegic on the left side. There is complete loss of power in the arm; the leg is only partially paralysed; the mouth is drawn to the right.

tongue, when protruded, points to the left; pupils equal, contracted, no squint or impairment of vision; speech thick and indistinct, no aphasia; no loss of sensation, either of touch or of special senses. He is quite sensible. He has a frequent dry cough and some difficulty in breathing. The respirations are 32 in the minute; the breath-sounds are attended with sibilant and sonorous rhonchi; chest resonant; heart's sounds and action normal; pulse 100; urine pale, slightly acid, sp. gr. 1015; temperature 99.2°. The paralytic phenomena continued without change, but the bronchitis and dyspnoea increased rapidly; and he died of the effects of bronchitis on the evening of the 22nd. Before death he became very livid and partly unconscious; his respirations rose to 48 in the minute, and his pulse to 144. His temperature never exceeded 101°.

Autopsy.—The basilar artery, just before giving off the posterior cerebrals, was obstructed for a length of two or three lines by a firm, decolourised, adherent clot, and the fore part of the pons was softened, and broke up under a stream of water. No other cerebral disease whatever was discovered. The heart was enlarged on the right side; but all the valves were healthy; and there were no vegetations. The tricuspid, however, was incompetent under the water test. The pleuræ were extremely thick and strongly adherent. The lungs were congested, and the bronchial tubes were dilated and contained muco-purulent fluid. Other organs healthy.

CASE 5.—*Paralysis of left side, loss of power of articulation, conjugate deviation of eyes to left side, with nystagmus. Softening of medulla oblongata. Tubercle in lungs. Ulceration of mitral valve.*

Emma S., a married woman aged 53, was admitted under my care on November 1, 1886. She had been ailing for the previous two months, and during the last month had had occasional shivering fits, sometimes lasting for half an hour. She had been very drowsy, and also thirsty, for a week.

At 7 o'clock on the morning of admission her daughter went into her room to take her some milk. At that time she was pretty well, and said that she should get up in a short time. At 11 o'clock she was found partly dressed, lying insensible on the floor, and very pale. When her daughter saw her shortly afterwards she had recovered somewhat, recognised her and uttered her name.

State on admission at 5 P.M.—She was a well-nourished woman. Her surface was cold and perspiring profusely. She appeared to be perfectly sensible, and tried to answer questions; but was unable

to articulate. The left side of the face was weaker than the other; the mouth a little drawn to the right when she showed her teeth; and the left side of the forehead a little less inclined to wrinkle than the opposite side. The eyes were strongly turned to the left, and could not be made to move towards the middle line. The pupils were contracted and did not appear to act to light. Fundi normal. There was neither ptosis nor inability to close the left eye. The tongue, which was furred, was protruded straight. The left arm was completely paralysed, but the hand could be moved, though only slightly; there was no rigidity. She could move her legs as she lay in bed, but the left was weak; the knee-jerks were brisk, and on the left side there was ankle-clonus. No anæsthesia anywhere.

No complaint of thoracic or abdominal disease was made, and no signs of anything of the kind were discovered; excepting that the urine had a sp. gr. of 1010 and contained a trace of albumen. Pulse 92. Respirations 40, inclined to be stertorous. Temperature 98·4°.

Nov. 2.—At 1 A.M. the patient broke out into a profuse sweat, and her temperature was found to have risen to 102·2°. It soon became normal, however, and at 8 A.M. was 98°. She was then in the same state as on admission. At 1.55 P.M. she had a rigor lasting a quarter of an hour, at which time her temperature was 100°; she was unable to move the left arm or hand, but could move the left leg; there was very slight paralysis of the lower part of the face. The tongue was protruded straight; the eyes still deviated strongly to the left, though with an effort the pupils could be brought almost to the middle line, and nystagmus was developed in the left eye. The water had been drawn off since admission, but the bowels had not acted. At 4 P.M. the temperature rose to 104·4°, and a profuse perspiration broke out. At 8.30 P.M. the temperature had fallen to 98·4°. She was then, as she had been all along, perfectly conscious, but unable to articulate; her pulse was 84, occasionally intermittent, and her respirations stertorous and 50 in the minute; the left pupil could be brought to the mid-line; but the right was with difficulty and rarely moved from the inner canthus. Urine passed in bed.

Nov. 3.—At 4 A.M. her temperature rose again to 100°, and from 9 A.M. till her death, it ranged from about 102° to 102·4°. There was no material change in her symptoms: her paralysis and the condition of her eyes remained unchanged, but she passed her evacuations into the bed; her pulse rose to 120, and her respirations to 56; she became weaker; and she died at 4 P.M., remaining conscious to the last.

Post-mortem Examination.—There were old pleural adhesions, especially strong at the upper part. The apices of the lungs, mainly that of the left, presented a good deal of indurated tissue, some small, thick-walled cavities, a few old calcareous concretions, and a small number of miliary tubercles. The lungs were œdematous. The pericardium was adherent in the greater part of its extent. The heart weighed $12\frac{3}{4}$ oz. The right side and the left auricle were somewhat dilated. The mitral orifice was a little contracted, and the anterior flap, with the attached chordæ tendinæ, was thickened and contracted; and in the free edge of the thickened part there was a deeply excavated area, with a few minute vegetations around. Aortic valve normal. The kidneys weighed 8 oz. and were a little granular on the surface in places. The cortex of the left presented an old wedge-shaped decolourised infarct. Other abdominal organs healthy.

The membranes and surface of the brain, and the vessels at the base, were all healthy. On cutting into the pons, the middle half of the right side was softened, and of a yellow tint. The surface of the pons and the floor of the fourth ventricle were healthy; but the softening occupied nearly the whole thickness of the pons between these surfaces. A smaller patch of similar softening was found in the left half of the pons. This also did not involve the surface. It lay in the fore part of the pons, but did not reach the crus. Every other part of the encephalon was healthy. There was no sign of descending change in the medulla.

CASE 6.—*Apoplectic fit, followed by loss of speech, paralysis of lower part of left side of face, with twitching, mainly on left side of body; paralysis of right third nerve with conjugate (?) deviation of eyes to right, and spasmodic action of fourth nerves; thrombosis of basilar artery, and softening of left optic thalamus, posterior part of caudate nucleus, and posterior third of internal capsule.*

Peter M., a commissionaire, aged 41, was admitted under my care on March 22, 1887.

For ten days or a fortnight he had complained of pain in left leg and at back of head; and for three days had suffered from 'neuralgia' of head, not referred to any one spot. Early in the morning of the day of admission the pain was so severe that he said 'he should go mad,' and at 6 A.M. he had a fit and became paralysed. Was said to have spoken after the fit. Was admitted at 2 P.M.

State on Admission.—A powerfully-built man lying on back with closed eyes, breathing somewhat stertorously, and moaning with each expiration. Skin warm and moist; all limbs occasionally

twitching. The mouth was slightly drawn to the right; the tongue, which did not deviate, could be protruded to a slight extent, the left side of the face at the same time twitching. When addressed he apparently tried to answer, but made only a low moaning noise. There was ptosis on the right side, and the right eye (the pupil of which was dilated and inactive to light) was directed outwards, with occasional slight rotation of the pupil upwards and to the left. He could open the left eye; the pupil of which was small and inactive, looking downwards and inwards and occasionally moving a little further in the same direction. No deviation of head. There was no definite paralysis of the limbs, and no anæsthesia. Reflexes present and normal. Pulse 80. Respirations 20. Temperature 98.2° .

At 3 P.M. there appeared to be more twitching of the left arm and leg than of the right, and the right arm was more flaccid than the other; the urine removed by catheter had a sp. gr. of 1026, was acid, clear, and free from albumen.

At midnight he was insensible and could not be roused; his breathing was more stertorous than it had been, and he had vomited, and there was less marked deviation of the eyes to the right.

At 4.30 A.M. on the 23rd he was still insensible and breathing noisily; the distortion of the face and the inequality of the pupils were as on admission, but both eyes were looking straight forwards. His pulse was 168: his respirations 44, and his temperature (which had been 101.2° at 6 the previous evening) was 105.2° .

His general condition remained unaltered; but the temperature gradually rose. At 6 it was 105.8° ; at 8, 106.2° . He died at 8.30 A.M.

Autopsy.—No gouty deposits in joints or vegetations on valves of heart. Slight atheroma in aorta. Thoracic and abdominal viscera all healthy.

There was slight atheroma, in patches, of the vessels at the base of the brain; and at the commencement of the basilar, just at the junction of the vertebral arteries, was a small, pale, decolourised clot, adherent to the wall of the artery, but not completely blocking it up. Some recent dark clot extended a little way into the left vertebral; and both posterior communicating arteries contained coagulum of similar kind. The middle and posterior cerebrals were not obstructed. The pons showed no change in appearance or consistency. The only lesion found in the brain was slight softening, with a little yellow discolouration, of the posterior part of the caudate nucleus, most of the optic thalamus, and the posterior third of the internal capsule on the right side.

XXII.

ON MYELITIS.¹

ACUTE inflammation of the spinal cord is always a serious disease, generally attended with grave danger, and in a large proportion of cases fatal. But it varies so much in its symptoms, in dependence partly on the seat and extent of inflammation, partly on its intensity, that its diagnosis is often very obscure, and it is consequently liable to be confounded with other affections of the cord, or with disease of the peripheral nervous system.

As a contribution to an exceedingly interesting subject, I propose to narrate, and comment briefly on, several cases of what were, or on good grounds were believed to be, acute myelitis, but which yet differed so much from one another in their severity, in their symptoms, and in their event, that they might well seem to have little or no pathological connection with one another.

The first case I shall quote is a typical example of severe myelitis ending in incomplete recovery.

CASE 1.

The patient was a rural postman, 19 years of age, who was sent to me, on May 17, 1886, by Mr. Alfred Wright of Romford. On May 9, while going his usual rounds he felt hot, for the day was sultry, and to cool himself walked into a brook with his boots on, and then lay on the grass and fell asleep. After he had thus rested for a time he walked home, feeling perfectly well, and he remained well during the rest of the day. Shortly after going to bed, how-

¹ Paper read before the North London District of the Metropolitan Counties Branch of the British Medical Association, April 28, 1887.

ever, he experienced some numbness and tingling in his arms and legs, and observed that he had a little difficulty in moving them. These symptoms had become much aggravated by the next morning, when he was found to be suffering from incomplete but well-marked paralysis of the arms and legs, with numbness of the lower extremities. The paraplegic symptoms increased upon him during the ensuing week, at the end of which time he was admitted into St. Thomas's. He had, up to the onset of his illness, always enjoyed excellent health, and had never had syphilis or rheumatism. He was a spare, healthy-looking youth, suffering from paralysis of his limbs and trunk, difficulty of breathing, and want of control over the rectum and bladder. He had absolute motor paralysis of the lower extremities, of the intercostal muscles, and of the other muscles of the walls of the trunk; so that he was quite unable to move any part of the legs, or to shift the position of his body as he lay in bed. The upper extremities were partially paralysed. He could not move his fingers or thumbs in the least degree; he could flex and extend the hands on the forearms slightly, and could also pronate and supinate the forearms. The triceps muscles were almost absolutely powerless; but the flexors of the forearms on the upper arms retained some power, and the arms consequently tended to become flexed at the elbows. He could use the muscles about the shoulder-joints fairly well. His breathing was entirely diaphragmatic; and, though he seemed to breathe without particular difficulty while making no effort, he soon became breathless when speaking or coughing. There was no paralysis of the muscles of the head and neck or face. The paralysed muscles were flabby, but not tender. Sensation was impaired, but nowhere absolutely lost, throughout the lower extremities and the lower part of the trunk to the level of the fifth dorsal vertebra behind and the ensiform cartilage in front. The anæsthesia extended a little higher on the right than on the left side. The tendon reflexes at the knees were wholly absent. The plantar reflexes were brisk on the left side, feeble on the right. The cremasteric and abdominal reflexes were absent; the scapular well-marked. The scratch of a pin on any part of the body was followed in a few seconds by factitious urticaria. The bladder was distended, the urine dribbling away. This fluid was slightly ammoniacal and cloudy with mucus. Bowels confined; but the fæces had escaped unconsciously. The skin over the sacrum was reddened, but as yet free from bed-sore. There was no affection of the organs of sense, and the pupils and optic discs

Temperature 99·8°; pulse 72; respirations 16.

Two or three weeks after admission the patient re-

mained very ill, suffering much from inflammation of the bladder, occasional dyspnoea connected with the paralysis of his intercostals, and loss of appetite, and sickness. Moreover the anæsthesia became more pronounced and extended a little further upwards; and the paralysis of the arms, and more especially of the left arm, increased; the arms, too, became rigidly flexed at the elbows, owing apparently to the combination of absolute paralysis of the triceps muscles with the retention of comparatively considerable power in the flexors; and bed-sores formed. Even during this period, however, there was some return of power to the left lower extremity.

After this there ensued a period of two or three months, in the course of which there was, on the whole, considerable improvement; but during which certain phenomena remained with little change or even underwent aggravation. The anæsthesia gradually disappeared. Its upper limit descended slowly; and recovery advanced more rapidly in the legs and feet than in the thighs and lower part of the abdomen. By the end of August sensation was completely restored. The arms never lost feeling.

The improvement in the voluntary power over the lower extremities was uniform though slow. The left recovered the more rapidly; but slight return of movement was noted in the right as early as June 10. A week later feeble knee-jerks were for the first time obtained. They were well-marked a few days later, and soon became unduly brisk; and early in July ankle-clonus was elicited on both sides. At this time he was able to move his legs, ankles, and toes freely as he lay in bed, the movements on the right side being feeble, those on the left of considerable power; the muscles of his trunk had all become stronger, and he was consequently able to move himself freely in bed. By the middle of August he could stand with assistance, and early in September he could walk across the ward by himself. At this time the lower limbs were small, having emaciated in some degree during his illness, but there had been no disproportionate wasting of muscles, and the knee-jerks continued excessive and ankle-cloni well-marked.

The recovery of the intercostal muscles was extremely slow; nor was it easy to say when improvement began in them. Early in September, however, it was noted that the lower intercostal muscles acted fairly, although the upper ones seemed still powerless. Not long afterwards the chest moved freely.

As before remarked, the upper extremities, and more especially the left, continued to fail after the patient's admission, so that at the end of a few weeks he had no power whatever in the forearms or hands or in the triceps muscles, though the flexors of the fore-

arms on the upper arms still retained some power, and the muscles about the shoulders, though extremely weak, remained relatively strong. These muscles, moreover, wasted very rapidly. The deltoids became small and the muscles of the upper arms shrank almost to nothing. But the most remarkable attenuation was shown in the forearms and hands. The former became little more than skin and bone, and presented concave depressions before and behind, between radius and ulna, in their whole length; the thenar and hypothenar eminences wholly disappeared, and the spaces between the metacarpal bones were deeply depressed. But long before the emaciation of the forearms and hands had attained its extreme point, the muscles about the shoulders and those of the upper arms had begun to improve; so that about the middle of July he could raise his upper arms freely and could extend the forearms. The improvement continued up to the time of his leaving the hospital. But little or no change took place in the condition of the forearms and hands; and the muscles of these parts, for the most part, refused to respond to galvanism. On the right side, however (which had always been somewhat less affected than the left), the patient could adduct the thumb slightly; and the extensors of the wrist and of the fingers showed a trace of galvanic irritability.

The bed sores, which were in process of formation at the time of admission, were slow in healing. They finally got well during the month of September. It was long before he obtained complete power over the bladder; the urine up to a late period running away from him involuntarily as he lay in bed. It was long also before the inflammation of the bladder, which presented occasional relapses, wholly subsided, and the urine became absolutely healthy.

He was discharged from the hospital on January 1, 1887, being at that time in excellent bodily health. He was very thin; his legs were small, and there was exaggeration of tendon reflexes with ankle-clonus, but he could walk well; his trunk muscles had recovered perfectly; he had the use of the muscles of the shoulders and upper arms, which, however, were small and weak; but there was scarcely any amendment in the forearms and hands, which still presented no visible trace of muscle, and the latter of which were without power of voluntary motion, and bent into the form of claws.

The treatment consisted mainly in rest, in sedulous attention to the condition of the skin and bladder, in the endeavour to improve the general health with tonics, &c., and for some months in the daily use of the constant current.

There can be no doubt that the case just narrated was a typical case of myelitis, brought on by exposure to cold and wet, affecting mainly the cervical and upper dorsal portions of the cord, and resulting (as so often happens in cases in which the inflammation is extensive and severe) in permanent disorganisation of certain tracts of the cord, and permanent paralysis with nutritive lesions in the peripheral organs innervated from these disorganised tracts. I may add that I have seen the patient at intervals since he left the hospital, and that the condition of his upper extremities remains unchanged, while in all other respects his health has improved.

It is interesting to compare with this case another which has recently been under my care, in which the affection was extremely slight (so slight indeed that possibly some may be inclined to dispute the accuracy of my diagnosis), and from which recovery was comparatively rapid and complete.

CASE 2.

A healthy young man of 19, a clerk on the Stock Exchange, went on Sunday, December 19, 1886, for a walk from the West End of London to Hampstead Heath. The day was extremely cold, and he sat and sauntered about on the heath for some time. He walked home, and on his way complained that his legs were cold, and that he could not make them warm. The next day he went to the City as usual, and continued to go backwards and forwards until Christmas Day. During this period the sense of coldness in his legs continued; and occasionally he complained of numbness in them, and of pins and needles, especially when they were touched. On one occasion he went to the closet, and got up after a time, thinking he had gone ineffectually, but found to his surprise that he had passed a large stool. This was the only occasion on which anything definitely amiss was noticed in regard to his emunctories. His brother, who was a medical student, found out also during this week that there was impairment, but not actual loss of feeling, in the feet, ankles, and along the front of the legs, and that his tendon and superficial reflexes were normal. I did not see him professionally until the 25th, when there was already some improvement. At that time he still complained of coldness, with pins and needles, in the legs; and there was marked impairment of sensibility in the regions before named. But his reflexes were normal, and he was healthy in all other respects. In the course of the next ten days

the condition of his right leg became normal ; but the left leg from the knee downwards still felt slightly numb ; and tactile sensibility was obviously impaired in the feet and ankles. At the end of a fortnight from that time he was perfectly well. On subsequently making minute inquiries I learnt, in addition to what is stated above, that while at his worst the passage of his motions was scarcely perceived by him, and that on several occasions he dropped a slipper and walked about without knowing it. His general health throughout was perfectly good ; his tendon reflexes remained unaltered, and his muscular strength appeared to be unimpaired. He never had tenderness or pain in the muscles or nerves. He has continued well ever since.

There is no reason to doubt, I think, that this was a slight case of myelitis. The apparent cause, the symptoms, and the result are all compatible with this view. The only reasonable alternative suggestion is, that it may have been a case of multiple neuritis. Whichever hypothesis, however, be accepted, it is obvious that the sensory region was alone or mainly involved.

In contrast with the last, the next case presented impairment of the motor functions only.

CASE 3.

The patient was a married woman, aged 49, who had enjoyed excellent health. She had been nursing her mother, night after night, for some time ; going to the house (which was about a mile from her own) every evening. On the evening of January 9, 1887, which was exceedingly cold, she was kept standing outside her mother's house for a considerable time, and she recollects that while waiting she had slight aching throughout the left leg. She sat up as usual, the room being very cold, and her legs feeling very cold. About 3 A.M. she tried to rise from her chair, and found to her surprise she had lost all power in her legs. She had to be taken home in a cab, and remained paralysed, and with little or no control over her evacuations, until her admission on January 20. She said that her legs had felt numb for a day or two at the beginning, but that this condition had disappeared.

On admission she had a few small bed-sores ; she was unable to stand, but could move her legs freely in bed ; there was no pain or loss of sensation ; the knee-jerks and plantar reflexes were

present; she could not sit up without assistance; the urine dribbled away and the motions escaped without control; she presented some tenderness along the dorsal spine, and the left lower extremity was somewhat œdematous. It may be added that she had had œdema of the left leg off and on during the last two or three years. With the exception that her bed-sores troubled her for some time, and that for some time her urine was ammoniacal and offensive, she improved rapidly during the early part of her stay in the hospital. The right leg had recovered completely by the end of three or four weeks, and the left leg had improved so much that with assistance she could walk a little; also she re-acquired control over the rectum and bladder. Then the œdema of the left leg increased, and this limb consequently became weak; and she continued with little change for two or three months. Subsequently the œdema diminished, and the left leg improved again; but when she left the hospital, nearly five months after admission, the left leg was still somewhat œdematous, and was still so weak that (though she could move it freely) she was unable to stand upon it. It was supposed that the œdema was connected with some old plugging of the veins. At any rate no disease within the abdomen that might account for it could be discovered. I may here mention that the tendon reflexes became unduly brisk.

In this case, as in the last, there is room for difference of opinion with regard to the nature of the disease. It is obvious, however, that the lesion occupied the motor region of the cord, and only a limited extent of it in the dorsal region. There was certainly no evidence of vertebral disease; there was no history of syphilis, nor was she treated for syphilis; there could not have been a tumour. Indeed, the only alternative suggestion is that there may have been sudden hæmorrhage in the substance of the cord. This explanation, however, is for many reasons unlikely.

I pass from these to the consideration of two other cases, in which fatal myelitis was associated with similar affection of limited regions of the nervous organs within the skull: cases which seem to show that, just as the more chronic inflammatory condition, commonly called sclerosis, has a tendency to attack at the same time, or in sequence, different parts of the nervous centres, so the more acute form of inflammation may occasionally become disseminated. At any rate they

show that inflammatory softening, at first limited to the brain or cord, is apt to become complicated by inflammatory softening of other parts of these organs which have no direct or apparent connection with the regions affected in the first instance.

CASE 4.

The first of these cases was published in detail in the fourth volume of the Ophthalmological Society's 'Transactions' by my colleagues Dr. Sharkey and Mr. Lawford. It was that of a girl, aged 17, who was admitted into the Royal London Ophthalmic Hospital on November 22, 1883. She had had fairly good health up to November 9. On that day her eyesight began to fail, and by the 13th she was quite blind. She had had neither headache, sickness, paralysis, nor fits. On admission she was well nourished but somewhat anæmic. She had slight enlargement of the thyroid body, which had existed as long as she could recollect, but her only complaint was of blindness. The pupils were dilated and inactive to light, but there was no ocular paralysis. Well-marked optic neuritis was discovered in both eyes. In every other respect she seemed healthy.

She continued in the same state until December 8, when she observed a little weakness in the left leg; this rapidly increased, so that on the 12th, when she first complained of it, she could not walk; the leg was powerless and slightly rigid; sensation was impaired in it, and the knee-jerk was excessive. On the 13th the paralysis of the left leg had advanced, and there was also slight loss of power in the right. On the 14th there was absolute loss of power in the left lower extremity, and anæsthesia extended on the same side as high as the nipple; the right leg was partially paralysed and anæsthetic, and she passed urine into the bed for the first time. In the course of the morning she had a fit lasting for about ten minutes, and unattended with unconsciousness, in which the right arm and leg were convulsed. Her temperature, taken in the day, was 100·2° F., and her pulse 96. On the 15th she was emotional and excited at times, and passed her evacuations unconsciously. On this day she was removed to St. Thomas's, and placed under my care. She continued in much the same state. On the 19th, 76 ounces of urine, which were clear and acid, but offensive and containing a trace of albumen, were drawn off. On the 22nd it was noticed that there was complete paralysis of both legs, loss of control over the emunctories, evident weakness of the left hand, loss of

sensation, not only in the legs and over the greater part of the trunk, but likewise in the left forearm and hand on the ulnar side. The knee-jerk was excessive on the left side, normal on the right; no ankle-clonus; no tendon reflexes could be obtained in the arms. On the 23rd sensation was impaired in the right forearm and hand, and she complained of pain across the lower part of the abdomen. On January 4 it was noted that the condition of the legs remained the same, that sensation was deficient in both forearms, and that the urine was offensive and contained pus. The muscles and nerves of the affected limbs were reported by Dr. Kilner to present the reactions of degeneration. The temperature, which had only been moderately raised up to December 29, had since that date varied between 101° and 105° . There was also much epigastric pain. Little alteration occurred during the next few days, excepting that the presence of peritonitis became evident, and a slight double external squint was noticed. She died on January 12, sixty-two days from the time when her vision first failed, and twenty-nine after the first appearance of symptoms of paralysis.

Necropsy.—There was acute peritonitis, due to extension of inflammation from the bladder, the mucous membrane of which was intensely inflamed. The inflammation had extended all along the ureters to the pelves and substance of the kidneys. The thyroid gland was considerably enlarged. The brain and contents of the skull generally to the naked eye appeared to be absolutely healthy; but microscopic examination showed that there was intense inflammation of the optic discs, nerves, commissure, and in a less degree of the optic tracts; and that slight evidences of inflammation were present in the meninges about the chiasma and on the adjacent surface of the frontal lobes. The spinal cord presented no abnormal appearances, except over a space two or three inches in length in the lower cervical and upper dorsal regions; there it was intensely congested and much softened. The microscopic appearances of the affected region confirmed the opinion that the changes were due to inflammation. In the cervical cord above the seat of obvious disease, inflammatory changes were observed extending along the columns of Goll; and, again, in the lumbar enlargement the columns of Goll were alone affected, the nerve-fibres having undergone complete granular degeneration, and some of the vessels being crowded with leucocytes. The other parts of the cord appeared to be healthy.

CASE 5.

The next case was sent into the hospital on December 28, 1886, by Dr. Bower, of Peckham Rye, and placed under my care. The patient was a labour-master at the Camberwell Work-house, aged 24. In 1883 he had had syphilis, followed by slight secondaries, but in other respects seems to have been healthy until last September, when he began to complain of occasional lumbar pain, aggravated by exercise. This, which did not prevent him from working, continued without much change up to eight weeks ago, when it became more severe, extended up the back as high as the shoulders, and outwards into the hips. He was now compelled to take to his bed, and from about this time he gradually lost power over his lower extremities and control over his rectum and bladder.

He was a well-built but pale and spare man, with an anxious expression of face, and complaining of pain at the back and front of the head, and pain in the loins extending at times to the hips, of absolute loss of motor power in the lower extremities, and of incontinence of urine. He had no voluntary power whatever over the legs, but sensation in them was perfect. The knee-jerk was absent on the right side, and feeble on the left; but the plantar reflexes were brisk, as also were the cremasteric and abdominal. No other nervous affection was present, and the pupils acted to light and accommodation. He had no tenderness or curvature in the spine, and there was no evidence of tumour anywhere. The urine was alkaline and ammoniacal, and there was a small bed-sore. His thoracic and abdominal organs appeared to be healthy.

No improvement whatever took place after admission. On the contrary, the symptoms underwent gradual aggravation: the paralytic affection of his lower extremities increased; the bed-sores extended in area and depth; the bladder (varying a little from time to time) continued inflamed; he lost flesh and strength; and he suffered so much and so constantly from pain in the loins, hips, and back of the thighs, that (although no tumour could be felt) it led me to suspect that he was suffering from malignant disease about the lumbar vertebræ—a suspicion which I entertained to the last.

On January 6 it was noted that sensation had become impaired in the left lower extremity, as high as the knee in front and the buttock behind, that both knee-jerks were now absent, as also the cremasteric and lower abdominal reflexes. Early in February it was observed that his legs were apt to become stiff and drawn up

involuntarily; but, excepting that he was weaker and more emaciated, no change of importance had taken place. The plantar reflexes were present, but feeble.

During the afternoon of February 4 it was found that the patient had almost suddenly lost the use of his left arm; he could not lift it from the bed. He had no power of flexion at the elbow, and very little power of flexion or extension at the wrist or finger-joints. The hand felt numb, but there was no discernible anæsthesia. The elbow-jerk was diminished on this side. No pain, giddiness, or fit of any kind attended or had preceded this paralytic attack. On the 6th the loss of power in the arm (which was kept rigidly extended) was absolute, but there was still no anæsthesia in it; also the tongue was protruded to the left, and there was some weakness of the lower part of the left side of the face. These facts were important, for they showed that the paralysis of the arm was not spinal, as had been at first suspected, but cerebral. About this time it was noted that painful impressions made on the left leg were referred by the patient to the right leg; but he was apathetic, and always disinclined to concentrate attention or to answer.

Very little further change occurred. A day or two after the last observation was made the paralysis seemed to have disappeared from the face and tongue, and the patient was able to move his thumb and fingers slightly; but shortly afterwards the weakness of the lower part of the face and tongue returned. His bed-sores, which had improved, began to extend; his urine was ammoniacal, loaded with ropy mucus, and highly offensive; he grew more and more apathetic and drowsy, though still wearing the aspect of much suffering; his pulse became rapid, he perspired profusely, and evidently the end was fast approaching. He died at noon on February 18, his death being preceded by drowsiness, profuse sweating, great rapidity of pulse, and rising temperature. This had varied for the most part since admission between 97° and 101° , but on the evening of the 15th it rose to 102° ; during the 16th and 18th it varied between 98° and 100.4° ; at 6 A.M. on the 18th had risen to 105.6° , at 10.30 to 107.6° , and immediately after death was found to be 109.4° .

It need only be stated, as respects treatment, that having regard to his syphilitic history he was put on a course of iodide of potassium and mercury, that morphia was employed to relieve his distress, and that his bladder was systematically emptied and washed out with antiseptic solutions.

Necropsy.—The body was much emaciated, and there was a large

and deep bed-sore over the sacrum. There were no syphilitic lesions anywhere, and, with the exceptions to which special attention will be drawn, the viscera were healthy. Membranes of brain healthy. A few patches of thickening were observed in the arteries at the base of the brain, but the vessels were all pervious. In the centre of the right centrum ovale minus was a patch of yellow softening, in which were a few small hæmorrhages. It was ovoid, about three-quarters of an inch in its long diameter, and only a few lines thick. Another patch of softening, about the same size as the last, and also on the right side, involved the posterior third of the lenticulo-striate portion of the internal capsule, and the contiguous parts of the caudate and lenticular nuclei. The two patches were quite independent of one another. In all other respects the brain was healthy.

Membranes of cord healthy. From the tenth dorsal vertebra downwards the cord was extremely soft, in fact almost diffuent. The grey and white matter could scarcely be distinguished in the lumbar region. To the naked eye all other parts of the cord seemed healthy.

There was no disease of the bones of the skull or spine.

The bladder was inflamed; the ureters and pelves of the kidneys were dilated and inflamed, and the substance of the kidneys was congested, and presented a few minute abscesses.

The last case I shall quote is one concerning the nature of which there may reasonably be, as in regard to my third case, some difference of opinion. On the whole I believe the case to have been one of myelitis; and partly for this reason, but more on account of its clinical interest, venture to include it in the present paper.

CASE 6.

W. J., a carpenter, was admitted under my care on March 25, 1886. His health had been excellent, but he said that he had had local venereal sores, though never secondary symptoms. In the previous November, he was struck in the right flank by a lift, which came down suddenly upon him, and squeezed him against a table over which he was leaning. He was laid up for nearly six weeks, not on account of any spinal symptoms, but mainly because of pain and swelling of the right knee. At the end of that time, though still weak, he resumed his work. His present illness dated from early in January, when he began to suffer from pain in the part of the back where he had been struck. This was followed by numbness

and weakness in the left foot, which, in the course of a day or two, extended up to the knee. A fortnight later he began to lose feeling in the right leg. The anæsthesia in his right leg and the loss of muscular power in his left had progressively increased, but he had never had incontinence of urine or fæces.

State on Admission.—A healthy-looking, well-developed man. He had complete anæsthesia and analgesia of the right lower extremity and right side of the trunk, as high as the sixth rib in front and tenth dorsal vertebra behind. There was also a belt of anæsthesia and analgesia, about four inches wide, encircling the left half of the trunk, the upper level of which corresponded to the upper level of the anæsthesia on the right side. There was no impairment of sensation on the left side, excepting in the belt above described. There was considerable loss of power in the left lower extremity. He could move all parts of it in all directions, but the movements were very feeble, and could be arrested by the finger. The right leg, he said, was as strong as ever it had been, and it appeared to be normally powerful. He could walk when supported on the left side, but he moved his left leg feebly, and, at the same time, its movements were ataxic. The superficial reflexes were much exaggerated on the right side; brisk, but normal, on the left side. On the right side the tendon reflexes were feeble, but on the left they were excessive, and there were both ankle- and knee-clonus. Moreover, the testing for reflexes in the left leg brought on violent tremors in it, lasting for some time. The abdominal reflex was absent on both sides. There was no loss of control over the rectum or bladder, no bed-sores, and no affection whatever of arms, head or neck, or organs of sense. There was no pain, tenderness, or curvature in the course of the spine.

It is needless to give details as to the progress of this case. It is sufficient to say that the account above given was fully confirmed by repeated observation; that he complained for some time of more or less uneasiness, pain, and sense of constriction about the loins and upper part of the abdomen; that gradually, in the course of months, sensation returned in great measure to the anæsthetic regions, and the left leg regained power; that after a while (although still the tendon reflexes remained more brisk on the one side, and the superficial reflexes more brisk on the other) the superficial reflexes became nearly equal on the two sides, while some excess of knee-jerk and ankle-clonus became developed on the right side; that delayed sensation was observed on the anæsthetic side as sensibility returned; that no evidence of spinal disease, or of tumour, or of extension of nervous lesion ever appeared; that his muscles had

not wasted, and his general health remained good; and that, when he left the hospital on August 11, although much improved, sensation on the right side was not restored absolutely, and his left leg was so weak that he could only walk with the aid of two sticks. But improvement was still in progress.

For a time the patient was treated (in the hope that his disease was syphilitic) with iodide of potassium and mercury; also an issue was made near the spine, in the neighbourhood of the part on which the blow had been inflicted; and, latterly, the constant current was applied systematically.

In introducing this case I said that there was room for difference of opinion in regard to diagnosis. The accident to which he naturally attributed his paralysis occurred eight or nine weeks before the onset of paralytic symptoms, and, although he was laid up after it for six weeks, this was mainly, if not solely, due to the injured knee; moreover, the blow he received from the lift was on the right side, just above the crest of the ilium, and did not involve the spine at all. I was disposed to think at one time that he had vertebral caries; nor can I be sure that this was not the case, for I have not infrequently known paraplegia to be due to vertebral caries, when there has been not only no spinal curvature, but no pain or tenderness whatever. But there was no direct evidence of caries, and the fact that he continued to improve, although allowed to get up, is opposed to this explanation. Whether the disease was syphilitic remains an open question. The patient seems to have had syphilis, but had never presented any signs of secondary or tertiary disease. The belief that the symptoms were due to inflammatory softening of the cord—which, on the whole, is the view of the nature of the case which I am now disposed to adopt—is not, of course, incompatible with the syphilitic origin of the disease. The case is the most striking example I have ever seen of the limitation, in disease of the cord, of anæsthesia to one side of the body and of motor paralysis to the other side. It is clear that the lesion, whatever it was, involved only a short length of the left half of the mid-dorsal region of the cord.

I have little to add by way of comment on the above series of cases. There are a few points, however, which they seem

to illustrate, and to which I may direct attention. In the first place, they show how widely cases of myelitis may differ from one another in degree of intensity and prospect of recovery. In the second place, they show that the inflammation may attack any region of the cord and any extent of it; and that the lesion may be multiple, and (as in disseminated sclerosis) affect at the same time or in sequence different parts, not only of the cord, but of the cord and brain. And, in the third place, they seem to show that, while in some cases the affection comes on immediately after its apparent cause, and rapidly attains its full development, in other cases its onset is insidious and its course progressive.

That myelitis is often attributed to exposure to cold or wet, or to both, is undoubted, and some of my cases are typical examples of this fact. It is probable in such cases that the onset is sudden, and the affection of the cord attains its highest point in a short time; but in some cases there is no evidence that temperature or allied conditions have had any causative relation to the attack. In my last three cases no such explanation was suggested. In two of them there was a history of syphilis, but there is no sufficient reason to assume that in either of them syphilis was the cause of the myelitis. In one of these two the patient had received an injury, but so long an interval had elapsed between the accident and the coming on of paraplegia, that it seems scarcely likely that this was the actual cause. In the remaining case, that of the girl of 17, there was no hint of syphilis or injury, and the girl had been a healthy girl up to the very moment at which failing sight gave the first indication of cerebral mischief. In her case, as also in my fifth case, the disease was prolonged and rendered fatal by secondary extension or dissemination of softening; but this extension would seem to imply the persistence and widening operation of the cause on which the primary lesion itself depended, and would suggest, therefore, either the presence of infective organisms or some constitutional defect, such as tendency (from whatever cause) to obstructive disease of small arteries, and consequent nutritive changes in the parts to which the obstructed vessels were distributed. I am inclined, arguing from the facts of certain

cases of softening of the pons Varolii and other parts of the brain which I have met with, and some of which I have published, to believe that in many cases of softening of the cord the softening is immediately due to obstruction (thrombotic or other) of the smaller arteries. And I may point out that the strict limitation of the lesion to the lateral half of the cord, as occurred in my last case, is best explained by this hypothesis. Such obstructions, as I have already hinted, might of course be syphilitic.

XXIII.

ON DIPHTHERITIC AND RELATED FORMS
OF PARALYSIS.¹

CASE 1.

H. A., a clergyman, aged 36, came into St. Thomas's Hospital on November 6, 1879. He had had in the previous June a bad sore-throat, attended with enlargement of the glands behind the left angle of the jaw. But, although he had felt feverish and ill, he had not consulted any medical man, and could therefore give no trustworthy information as to the nature of his attack. Doubtless he had then suffered from diphtheria. The first evidences of paralysis had shown themselves early in October, and were impairment in the quality of his voice and a tendency for fluids when being swallowed to return by the nose. Towards the end of the month he had further observed that he was getting weak in the legs, that he had numbness in the tips of the fingers and in both feet, and that there was loss of tactile sensibility in the tongue and lips, and impairment of taste.

On admission he was a healthy-looking man, complaining of various paralytic symptoms. The tips of his fingers were numb, but he had no obvious loss of power in the hands. His feet were numb, especially the left, so that he could scarcely feel the ground; and he walked with a feeble uncertain gait and with a tendency to fall over to one side. His eyesight would fail (words appearing misty) after reading for a minute or two; and there was some degree of loss of accommodation, but the pupils were equal and contracted to light, and there was no squint. He had numbness of the lips, tip of the tongue, and point of the chin, and was unable to distinguish between pepper, mustard, and salt placed on the tongue. The soft palate was pendulous, and did not contract when irritated;

¹ Paper read before Thames Valley Branch of the British Medical Association, Nov. 16, 1887 (with additions and alterations).

moreover, when he swallowed, the food was apt to pass into the nose, and also to lag about the level of the thyroid cartilage. His voice was nasal. Smell was much impaired. In all other respects he seemed fairly well.

During the next ensuing ten days several changes in his condition were recorded; and careful special examinations were made. The anæsthesia in the fingers gradually disappeared, first on one side and then on the other; but while sensation was returning weakness of the fingers and hands came on. The numbness became more profound in the feet, and extended up the legs, and the lower extremities grew weaker. At the same time he complained of pain and soreness in the feet. The numbness of the chin, lips, and tongue diminished, and he recovered to some extent taste and smell. His eyesight also improved, but his defective voice and deglutition continued. It was about this time also that he complained of numbness of the tip of the nose, of the glans penis and scrotum, and about the anus, and also that he was unable to strain at stool, owing to the fact that during the effort the air imprisoned in the chest escaped explosively through the rima glottidis. Mr. Nettleship's examination confirmed the fact that there was weakness of accommodation in the eyes, but that they were otherwise healthy. Dr. Kilner ascertained that there was some impairment of electric sensibility in both forearms and both hands, increasing from above downwards; but that the only arm-muscles whose electric contractility was impaired were the extensors of the first and second joints of the thumbs; that there was increasing loss of electric sensibility from the knees to the feet, where the strongest current could scarcely be felt; and that, while none of the muscles of the left leg below the knee responded to the induced current, the only ones that responded on the right side were the *tibialis anticus*, the *peronei*, and the *extensor brevis*. They were all unduly responsive to the continuous current. Dr. Greenfield's laryngoscopic examination gave the following results: There was partial paralysis of the muscles moving the vocal cords, mainly of the abductors, and slightly more on the right than on the left side, and considerable (though not absolute) anæsthesia of the epiglottis and of the soft parts around the vocal cords, but not of the cords themselves. In deep inspiration the cords separated to about one-third of the normal amount, and tended constantly to approximate; in phonation there was complete closure; and the voice (excepting that it was slightly nasal and a little hoarse, owing to slight catarrhal swelling of the parts) was unimpaired.

Subsequently to November 17 the changes were very gradual.

The hands and legs became more and more numb, and the patient progressively lost power in them, so that, about the middle of December, he could scarcely use them for any purpose, and his grasp was extremely feeble. Towards the latter end of November, also, it was noted that all the fingers except the first were flexed, more or less, into the palms, and could not be straightened. The numbness was still extending up the legs, and had become so profound in the feet and ankles that he could not there feel the prick of a pin. The loss of power also increased, so that by December 9 or 10 he was unable to walk, or even to stand, without assistance. He still also complained of pain and tenderness in the feet. On December 20 he first manifested some difficulty of breathing, and had to sit up in bed. It was thought that the respiratory muscles were weak; but there was no absolute paralysis of either the intercostal muscles or the diaphragm. This difficulty lasted a few days and then subsided. The impairment of accommodation, and the loss of taste and smell, together with the anæsthesia of the tip of the nose, lips, tongue, and chin subsided gradually shortly after admission. The nasal quality of voice and the dysphagia, as also the difficulty in straining at stool, were not observed after the first week in December. The improvement in the state of the hands and legs took place later, the hands recovering first. He left the hospital well on March 10.

The case was obviously a typical and an interesting example of the paralysis which supervenes after diphtheria. The nervous symptoms tended to be symmetrical, and spread from region to region, affecting the hands and legs in larger proportion than other parts. The paralysis of the extremities was attended with the so-called 'reactions of degeneration,' and the anæsthesia of the feet with a sense of soreness and pain. In addition, also, to defective accommodation and to weakness of the soft palate, there was anæsthesia of certain circumscribed tracts occupying the middle line of the body, including among others the epiglottis and parts about the rima glottidis; and some paralytic failure of the muscles of the larynx, which contributed to render straining difficult, and of the muscles of respiration causing dyspnoea.

CASE 2.

In 1880 I was not aware that any interest attached to the condition of the tendon reflexes in diphtheritic paralysis. My personal

attention was first drawn to the fact that the knee-jerks tend to disappear in this affection, by being called into the country to see in consultation a lady who was partially paralysed, and who was supposed, from the absence of knee-jerks, to be suffering from locomotor ataxy. The patient was a middle-aged widow, who had been accustomed to somewhat excessive indulgence in alcohol, but on the whole had had very good health.

On close inquiry I ascertained that just two months previously (at which time she was under the care of another practitioner) she had been attacked with sore-throat, which had laid her up for two or three weeks, and left her somewhat enfeebled in health. The affection had been declared not to be diphtheritic. A fortnight before my visit she had noticed a little numbness across the upper lip, which disappeared in the course of a day or two. Four days later she had been attacked with numbness in the fingers and hands, not confined to the regions of the ulnar nerves, but of general distribution. The anæsthesia was not absolute, for she could still feel, and was unattended with loss of power. Three days later she had noticed impairment of feeling and of muscular power in the feet, and this had since then reached the knees.

She was, when I saw her, a healthy-looking woman. Her hands were still somewhat numb, but they had much improved in this respect, and were not weak. The numbness in her lower extremities reached the thighs, and the weakness in her legs was so great that she could not stand or walk without assistance. The affection of the legs was still increasing. The knee-jerks were wholly wanting.

It was clear (even though a diphtheritic origin had been denied) that the case was really one of diphtheritic paralysis, and, in confirmation of the view that it could not be due to ataxia, I may add that the eyes were healthy in all respects, and that there had never been any gastric, rectal, or urinary trouble, or lightning pains. She recovered.

About the time at which this patient came under my notice the abolition of the tendon reflexes in diphtheritic paralysis was recognised also by other physicians; and since then it has been generally observed in this affection, and has come to be regarded as one of its distinctive features.

Lately, however, Dr. Herringham first, and subsequently Drs. Money and Barlow, have shown that, although the tendon reflexes do disappear in these cases, their actual disappear-

ance is generally, if not always, preceded by a period of several days' duration, in which they present excessive briskness. The fact had probably not been earlier recognised, because such patients are apt first to come under medical observation only after the symptoms have been in existence for a few days, and after the stage of exaggerated reflexes has passed.

The case I shall next narrate is interesting, because, not only was there this excess of tendon reflex, but it was maintained practically throughout the whole of the patient's illness, and was only replaced by its abolition after paralysis and numbness had disappeared, and the patient seemed to be in good health.

CASE 3.

M. O., a married woman, aged 29, came under my care on February 18, 1887. She had had what was supposed to be quinsy in the previous December. Her illness had begun with feverishness and shivering; she had had lumps in the neck; and her throat had been 'covered with a sort of skin.' She had recovered by Christmas, and had continued weak ever since. Her present illness had been coming on for two or three weeks. She had first observed some difficulty in swallowing; that, if she were not careful, fluids would return through her nose; and that often two or three efforts had to be made before even solids could pass from the pharynx into the œsophagus. Soon afterwards she had observed numbness and pins-and-needles in the fingers, and at the same time similar sensations across the upper lip. According to her recollection, weakness of her eyes had come on a little later. This had comprised loss of distinct vision for near objects, with inability to read, and some degree of diplopia. A week or two before admission numbness had come on in the feet, with a feeling as if of treading on cotton-wool; and the hands had become weak, but had since improved. The legs, which had been similarly attacked somewhat later, had continued to lose power. Her friends had noticed some change in the quality of her voice ever since the beginning of convalescence.

She was a weakly-looking person, complaining mainly of defective sight for short distances, numbness in the toes and fingertips, and inability to walk without assistance. Her eyes were in most respects normal; but the power of accommodation for near objects was impaired, and there was slight weakness of both

external recti, with double vision on looking to the extreme right or left, or at distant objects in front of her. The facial muscles, the tongue, and the fauces appeared natural, and she swallowed without difficulty, but her voice was still slightly nasal. There was no absolute anæsthesia, but the tips of the fingers and the toes and the front of the left leg were obviously numb. The grasp of the hands was feeble, and the movements of the left arm generally were relatively weak. She could move her legs freely; but in standing or walking (which she could only do with assistance) her knees were bent and inclined to give way, and she tottered on them. The abdominal and thoracic organs were all healthy. The knee-jerks were much exaggerated; the plantar reflexes were normal.

On February 21 it was noted that she complained of stiffness and a sense of twitching in the left arm; that the hand trembled when held out, and especially when carrying a glass of water to her lips; and that the hand and arm of this side remained weaker than their fellows; that there was slight horizontal nystagmus, and still slight diplopia as at the time of admission. Also the left pupil was a little larger than the right. During the next few days she regained the power of accommodation, and lost her diplopia and nystagmus; moreover, the numbness disappeared from her fingers, and there was some improvement in the sensibility and strength of her lower extremities. But the knee-jerks continued unusually brisk.

On March 1 she was able to stand for the first time without assistance, and with her eyes shut; but the feet were still numb; the knee-jerks were about normal. She continued to improve, and on the 10th was discharged apparently well. At this time she had no anæsthesia or obvious loss of muscular power, but the knee-jerks had become much less active than on admission, and were, if anything, less brisk than natural.

I assumed that the case would prove an exception to the rule with respect to the abolition of reflexes in diphtheritic paralysis. But the patient, who still continued in somewhat weak general health, came up periodically to see me at the hospital for some few weeks after her dismissal, and to my surprise the knee-jerks (although apparently she had completely recovered from her sensory and motor paralysis) disappeared absolutely at the end of a week or two, and had not returned when she finally ceased attendance.

Although as a general rule the paralytic phenomena of diphtheria are remarkable for their tendency to symmetry of distribution, as is illustrated in the foregoing cases, not merely by the condition of the extremities, but also by the patches of

anæsthesia distributed along the middle line of the body; the symmetry is not absolute; and already in two of the cases hints are afforded that local paralyses due to implication of single nerves are likely to be met with. The next case illustrates this fact.

CASE 4.

Mr. S., a gentleman, about 32 years of age, had had a sore-throat about a month before I saw him. He had not been sufficiently ill to lie up, and did not know he had had diphtheria, but had looked down his throat and seen a white patch on each tonsil. Within the previous week or two paralysis had been coming on, first in the left leg, then in the right leg, and later in the arms.

I saw him in consultation with Dr. Mennell, in April, 1884. At that time he was confined to bed. Feeling was impaired in his legs, from the knees downwards; he had very little motor power at the knee-joints, and could scarcely move the feet or toes at all; the muscles below the knees were tender, and the tendon reflexes were absent. He had numbness of the hands and forearms, and much impairment of muscular power in them. He also had numbness of the upper lip, tip of the tongue, and in a circumscribed area at the back of the neck. He complained of slight difficulty of swallowing, and he presented well-marked general paralysis of the left portio dura, which had only come on within the previous two or three days. There was no obvious affection of the eyes, no dyspnœa, no implication of the rectum or bladder; and in all other respects he seemed healthy. I did not see him again, but learnt that he recovered perfectly in the course of a few weeks.

I add the following case, because it is typical, and because it contains an exhaustive account of the electrical condition of the paralysed muscles by Dr. Kilner.

CASE 5.

R. O., a school-girl, aged 12, came under my care on March 12, 1883. In the middle of last December she had diphtheria, and was in bed for several days. This was followed by some difficulty of swallowing (fluids especially returning through the nose); by loss of visual accommodation, so that she could not see near objects distinctly; and, somewhat later, by loss of power and numbness, first in the arms, and then in the legs. The muscles of the trunk also became feeble, and before long her weakness grew so

extreme that she not only was confined to bed, but could not even turn in bed. During the last month her symptoms had greatly improved; she had recovered the power of swallowing and the use of her eyes; and the paralysis in her limbs had diminished.

On admission she was a healthy-looking girl. She was unable to stand, and only able to flex the legs at the knee-joints. She could move her arms pretty freely, but these limbs were obviously much weaker than natural; and the hands, when extended, assumed a claw-like form, the wrists dropping, the first phalanges being extended and the last two phalanges flexed. The muscles were not noticeably wasted, but they were limp and flabby; and there was a total absence of tendon reflexes in the arms and legs. But all the muscles were irritable, and contracted on being sharply struck. No loss of feeling. No loss of control over the emunctories. There was no paralysis of the facial or ocular muscles, or of the palate, and the eyes now acted to accommodation. Thoracic and abdominal organs healthy, excepting that the urine presented a trace of albumen.

A few days after admission Dr. Kilner tested electrically the muscles of the arms and legs, and found them generally to present the reactions of degeneration.¹ The patient gradually improved, and left the hospital at her own wish, before she was well, on April 8; but she could at that time walk with tottering gait, and the patellar tendon reflex was just showing itself in the left leg.

¹ (a) With induced current a much more powerful current was required to cause contraction than in health; (b) with constant current:

	RIGHT ARM		LEFT ARM	
Deltoid . . .	2·375 -	1·200 +	1·725 -	1·625 +
Triceps . . .	2·800 -	2·800 +	1·525 -	2·150 +
Biceps . . .	2·250 -	2·275 +	2·600 -	1·000 +
Extensors F. . .	1·950 -	2·025 +	1·980 -	·800 +
Flexors F. . .	2·200 -	2·000 +	2·125 -	2·150 +

	RIGHT LEG		LEFT LEG	
Quadriceps . . .	2·800 -	3·000 +	2·200 -	2·000 +
Adductors . . .	3·000 -	3·000 +	2·250 -	2·250 +
Extensors of leg . . .	1·800 -	2·200 +	1·225 -	1·825 +
Flexors of leg . . .	1·900 -	2·250 +	1·225 -	1·500 +

Normal reaction with constant current: 1·500 - 3·500 +

The foregoing cases are all of them typical, and afford between them excellent illustrations of most of the more interesting incidents of diphtheritic paralysis. They show how the affection comes on some little time, usually a few weeks, after the acute illness has subsided; how the paralysis (which involves sensory and motor nerves alike) tends to be of symmetrical distribution, to creep from part to part, and to subside in one region as it invades another; how the sensory disturbances are not limited to the extremities, but are apt to involve districts situated in the middle line of the body, including the tongue and mouth, and senses of taste and smell; how, also, the paralysis is liable to affect not only arms, legs, respiratory muscles and muscles of the trunk, muscles of accommodation, and of swallowing, but also the vocal cords, and even single nerves; how the tendon reflexes in the legs are first exaggerated, then disappear, and the affected muscles acquire the characteristic reactions of degeneration; and how, finally, while many of the phenomena are such as would seem to be best explained on the assumption that they are due to spreading neuritis, others (such as the sensory affections along the middle line, the early undue briskness of the knee-jerk, and nystagmus) seem rather due to some spreading central lesion. I am inclined to believe that, in diphtheritic paralysis, a wave, so to speak, of slight inflammatory mischief, spreads not only through the medulla oblongata and cord, but along the nerve-trunks also.

This brief recapitulation leads me on to speak of some of the diseases of the nervous system which present a resemblance to diphtheritic paralysis, and may even, under certain circumstances, be confounded with it.

I have already shown how the association of numbness in the feet, loss of voluntary power over the legs, and abolition of tendon reflexes (in a case which occurred when the condition of the tendon reflexes in diphtheritic paralysis had scarcely begun to be investigated and was certainly not as yet generally known), led to the fear that symptoms, which were undoubtedly diphtheritic, might be due to tabes. I do not think such mistakes can often be made now. Yet it is well to recollect that paralysis in diphtheria often follows so mild

an attack of the acute disorder, that the patient forgets to volunteer any remark as to the previous occurrence of sore-throat; and, on the other hand, that occasionally, in tabes, the paralytic symptoms are, or seem to be, of almost sudden onset.

But the cases most likely, I think, to be thus misinterpreted are those of multiple neuritis of other, and especially, perhaps, alcoholic, origin. It will be recollected that the lady whose case was thought to be one of tabes had been what is called a free liver.

CASE 6.

On November 19, 1886, a policeman, aged 39, came under my care. He had been a thoroughly healthy man, and had never had syphilis; but, though he was not a drunkard, or even in the ordinary sense of the term intemperate, it was ascertained, and admitted by himself, that for a long time he had been in the habit of taking a very large quantity of beer in the course of each day. Twenty-six days before (being at the time quite well) he got repeatedly wet through, and was in wet clothes nearly the whole of the day. On the morrow he went to his work, but complained of sore-throat, aching pains in his limbs, vomiting, diarrhoea, and general sense of illness. These symptoms seem to have been the beginning of a severe attack of quinsy, which, attacking first one side and then the other, kept him continuously ill, but without any special change in his symptoms, until June 18. On that day he first complained of tingling in the arms and legs, attended with some loss of power; and, in fact, on trying to walk his knees yielded under him, and he fell down. The muscular weakness increased upon him day by day, until, on the sixth day of his paralytic symptoms, he entered the hospital.

He was a spare, but well-built, and not unhealthy-looking man, complaining of sore-throat and weakness in the arms and legs. The tonsils, especially the right, the soft palate and uvula were still swollen and congested. He complained of a sense of numbness and tingling in the hands, but could feel. The grasp on both sides, and more particularly on the right, was extremely feeble, and although he could move his arms at the elbow and shoulder joints, their motions could be arrested by the mere pressure of the finger. There was no numbness in the legs, but he complained of pain in them, and their movements were extremely defective. He could not raise them from the bed, though he could bend his knees; his

feet were extended, and he could not flex them. The muscles of the upper and lower extremities, and chiefly those of the forearms and hands, legs, and feet were exceedingly tender and irritable; the tendon reflexes were wholly absent.

The case was a very long one, and the patient remained continuously under my care for the next nine months, and has lately again been a tenant of one of my hospital beds. The history, however, can be summed up in a few sentences. The throat-affection rapidly got well. The muscles of the upper and lower extremities, but mainly those of the forearms and legs, hands, and feet, rapidly lost power, and wasted to an extraordinary degree, and remained exceedingly tender. These conditions continued for the first few months of treatment, at the end of which time almost every trace of muscle had disappeared from the parts above specified; the forearms and legs apparently at length consisting of little more than the bones with the skin stretched tightly over them; the thenar and hypothenar eminences and the interossei being completely wasted, and the fingers bent so as to give the hands a claw-like form; and the feet being in essentially the same condition, but extended at the ankles, while the toes were flexed into the soles. About the end of this time amendment began to take place. The patient, whose bodily health had only been moderately good, began to recover the aspect of health, and flesh and strength. The muscular tenderness slowly disappeared, and the muscles of the upper arms and thighs began to regain bulk and power. Unfortunately, however, no beneficial restoration of the muscles of the forearms, legs, hands, and feet followed; and (with the exception that a few fibres of the muscles of the hands, sufficient only to cause almost imperceptible flickering of some of the fingers, have been spared) the distal parts of the limbs remain to the present time as much emaciated, as absolutely void of muscular tissue, and as useless as they were at the end of the acute stage of his disease.

It may be added that, shortly after admission, the muscles of the trunk became weak, so that he could not turn in bed, but recovered comparatively early; that the affected muscles soon showed the reactions of degeneration; and that the patient presented no other indications of nervous disorder besides those above detailed, and no evidence of the presence of any visceral disease.

I suppose it is arguable that the case just cited was really one of diphtheritic paralysis. That view is one which I considered and discarded. The following are the reasons

which influenced me. I came to the conclusion, after due inquiry, that the patient's primary attack had been one of tonsillitis and not of diphtheria; the paralysis came on while the primary disease was still acute, instead of a few weeks afterwards; and the general symptoms and progress of the disease corresponded with what one generally observes in cases of that form of paralysis which his habits had fairly earned for him. I have never known of a case of diphtheritic paralysis in which (if the patient do not die of it) ultimate recovery was not attained.

I quote one other case of so-called 'alcoholic' paralysis because it presented two features which bear some relation to phenomena also observed in diphtheritic paralysis—namely, loss of power in the respiratory muscles, and a curious kind of difficulty in swallowing.

CASE 7.

The patient was a married woman, aged 26, who came under my care on September 20, 1886, and was discharged convalescent on August 19 of the following year. She had indulged excessively in drink, especially of ardent spirits, for some years, and had been suffering from loss of appetite, sickness, and increasing weakness in the arms and legs for three months. She was fairly well nourished. There was some degree of numbness in both arms and legs; the arms were weak, and the weakness increased towards the fingers, which could not be straightened; the legs were so feeble that she could not stand on them, or even raise them from the bed. Her ankles were extended, the toes flexed towards the soles, and she had no power of moving them. The muscles of the forearms and legs were exceedingly tender, emaciated, and irritable, and the tendon reflexes were absent. There was also slight nystagmus. The symptoms were in progress at the date of admission, and within a few days it was found out that she had difficulty of breathing, liable to paroxysmal aggravation, and difficulty in the swallowing of fluids. As regards the dyspnoea, it was observed that there was a rapid expenditure of breath, so that she could only utter a few words at a time, that she had complete paralysis of the diaphragm, so that her breathing was wholly intercostal, and that she was liable to attacks of suffocative cough (induced mainly by swallowing fluids), in which she became livid in the face, and seemed in serious danger of dying. She had no paralysis of the mouth or soft palate, her voice was

not nasal or hoarse, and, as before stated, she could swallow solids without difficulty; but whenever she took even a mouthful of fluid, it was ejected within a few seconds with the symptoms of choking. She had no difficulty in carrying the fluid to the back of the mouth, and performing the act of deglutition; and it was not until a second or two had elapsed after the performance of the latter act, until the fluid had presumably passed some distance along the œsophagus, that the choking came on, that she coughed, and brought up with coughing the fluid she had swallowed. I was puzzled to explain these attacks; and seeing that they did not occur until the swallowed fluid had had ample time to reach the lower end of the œsophagus, I was inclined so associate them with the diaphragmatic paralysis. The dangers which attended her paroxysmal attacks of choking and cough were manifestly due to the mechanical difficulty in the way of effective coughing, occasioned by the paralysis of the diaphragm.

The affection of the respiratory muscles and of swallowing, which had only come on recently, subsided gradually and disappeared in the course of a few weeks. The numbness, wasting, and tenderness of the muscles of the limbs increased progressively for some months; and then, after a period of apparent quiescence, convalescence slowly took place. The arms improved, even while the disease was still in progress in the legs. When she left the hospital her general health was re-established; she had complete use of her upper extremities; and although the movements at the ankles and knees remained much enfeebled, she could walk in clumsy fashion, but without assistance.

I will trouble you with yet one other case, concerning which, as concerning Case 6, there is room for difference of opinion as to its nature. Had the patient come under my care with a history of sore-throat, I should (I think without hesitation) have regarded her illness as diphtheritic paralysis. It may be observed that the eyes do not appear to have been affected at any time; but in every other respect the symptoms and progress of the case were substantially identical with what we constantly observe in that form of paralysis. But the most careful inquiry failed to elicit the slightest evidence of antecedent diphtheria; and I have no doubt that the paralysis was really not diphtheritic. Again, had the patient habitually indulged in alcoholic drinks, even though her symptoms did

not conform to my experience of alcoholic paralysis, I should have been disposed to regard them as the consequence of chronic alcoholism. But there is no doubt that she was not a drinker in any true sense of the word. It is possible that some persons might be disposed to regard her symptoms as hysterical. I think, however, that that explanation may be at once dismissed. She had never shown symptoms of hysteria; and moreover the condition of the muscles and nerve-trunks pointed pretty conclusively to the presence of neuritis. It is an interesting fact that one of my pupils, Dr. Suzuki of Japan, a well-educated and able medical man, and having experience of the diseases of Japan, claimed the case as one of Kakke; and I, having no better name to apply to it, adopted the opinion and inscribed that name upon the bed-ticket. Beyond the fact, that in Kakke the patients suffer from multiple symmetrical neuritis, I do not pretend to know anything definite about the disease. But the anæmia, and dropsy and visceral symptoms, which are said to attend it and are looked upon as of importance, occur only in certain cases; and there can be no doubt, I think, that my case would have been regarded as one of Kakke had it occurred in Japan. At any rate the case was one, mainly of neuritis; and, although not one of diphtheritic paralysis, resembled diphtheritic paralysis so closely as to claim attention in connection with my present subject.

CASE 8.

Rose M., single, a housekeeper, aged 30, consulted me first on November 28, 1887. She had been somewhat out of sorts for twelve months, but had had no definite illness. She had been a perfectly temperate woman, had certainly never had syphilis, and had certainly not within the year experienced any sore-throat; neither had there been prevalence of diphtheria or sore-throat in the village in which she had been living. She had never shown hysterical symptoms.

About six weeks before I saw her she first complained of numbness and tingling in the tips of the fingers; which soon extended over the whole of the hands. Three weeks later her feet became similarly affected, and gradually the sensory disturbance extended upwards to the knees. When the symptoms first came on she had

some pain about the upper part of the back and down the arms; and latterly she had noticed that there was a little difficulty in swallowing solids.

She was a healthy-looking woman, suffering from tingling in the hands, and from the knees downwards, also in the lips and tip of the tongue, with much impairment of taste. She could feel, however, fairly well in all parts. There was no obvious loss of power in the hands or arms; but she walked with difficulty, and especially found it difficult to go up or down stairs. There was much tenderness in the calves, but none in any other part, and total absence of the tendon and plantar reflexes. There was no loss of control over the rectum or bladder; but she was never quite sure when the act of micturition had been completed. She had no affection of speech, of swallowing, or of respiration; or of her eyes or eyesight. Her thoracic and abdominal viscera were all sound. The urine was free from albumen. The catamenia were regular.

Her symptoms gradually developed from this time; and she came into the hospital under my care on December 9. She was, then, in very much the same condition as when I first saw her; but her symptoms were more pronounced. The tingling in the hands was very painful to her, especially when they were warm, and she did not feel readily with the tips of the fingers. There was no definite paralysis of the arms and hands; but they were somewhat weak. She could not walk or stand without assistance; but could move her legs freely. There was painful tingling extending from the toes to just above the knees, and impairment (though not actual loss) of sensation in the feet. The legs were inclined to be stiff, but there was total absence of tendon reflexes in them. The calves were still very tender and, moreover, the patient complained of general hyperæsthesia, most intense in the legs. There was still tingling of the lips and tongue, and marked impairment of taste, especially in the left half of the tongue, which could not distinguish between mustard, sugar, and salt. She also had a little difficulty in swallowing both solids and fluids, especially the latter, but this was more apparent to herself than to persons watching her; and was chiefly noticeable when she was in a hurry. The senses of hearing and smell were perfect, as also was her eyesight. The pupils acted to light and accommodation; there was no colour-blindness; and the fundi were normal. There was no wasting of muscles; and both those of the arms and those of the legs were irritable. She had no loss of control over the emunctories; but was still uncertain when she had fully emptied her bladder. On the

whole, the symptoms were all more pronounced on the left than on the right side.

For the next five weeks there was certainly no improvement; and in some respects she manifestly deteriorated. She complained constantly of the painful tingling in the hands and legs, which was especially severe when the limbs were warm, and more particularly at night, and kept her awake. She still suffered from general hyperæsthesia, and great tenderness in the muscles of the legs. The muscles of the forearms also became tender; and there was tenderness along some of the larger nerve-trunks in the arms and legs. Further, her hands and legs grew weaker; but the stiffness in the latter continued. The condition of her lips and tongue and taste remained unchanged; but her swallowing of fluids became more difficult, and she often choked. Dr. Semon examined her for me; and reported that the larynx was healthy; but that the tactile sensibility and reflex irritability of the soft palate were diminished. The reactions of the arm muscles to the induced and continuous currents were normal; but the muscles of the legs required abnormally strong currents of both kinds to cause their contraction. Latterly the painful tingling in the legs and feet was replaced to some extent by shooting pains.

About the middle of January a tendency to improve was observed. She began to be more cheerful, she slept better than she had done, she complained less of the painful tingling in her limbs and in her lips and tongue, and she lost her slight difficulty in swallowing.

Towards the end of the month, the improvement was well-marked. She had still no taste; but the tingling in her lips and tongue was very slight. She could use her hands and arms freely; had only a trace of tingling in the hands when she was warm, and only a trace of tenderness in the muscles. But the chief improvement was in the legs; for she could now stand without assistance, and could even take a few steps when slightly supported; she could feel the ground distinctly with her feet; and had very slight tingling in them, excepting when they were hot. The calves were still very tender, the muscles irritable, and the tendon reflexes absent. The plantar reflexes were normal. There was now no general hyperæsthesia.

By the time she left the hospital, on the 19th of February, she had almost completely recovered: her sense of taste had returned; she could knit without watching her fingers, and could dress and undress herself; she could walk fairly briskly several times round the ward; and she felt generally well. But there was still a little

tingling at times in the fingers, and more especially in the feet; there was still some tenderness in the calves, and along the larger nerves in the arms and legs; the muscles continued irritable, and the tendon reflexes had not returned. The muscles had not obviously wasted.

It may be added that throughout her illness her temperature was either normal or subnormal, and that she never presented any trace of albuminuria.

XXIV.

*ON THE EARLY RECOGNITION OF GENERAL
PARALYSIS OF THE INSANE, AND THE
RELATIONS BETWEEN THIS DISEASE,
TABES DORSALIS, AND DISSEMINATED
SCLEROSIS.¹*

At one of the examinations for the Membership of the Royal College of Physicians I was concerned in framing one of the written questions, the exact wording of which I have forgotten, but which in effect was, to invite a brief description of the clinical features of general paralysis of the insane, and a brief discussion of the differential diagnosis between this disease and tabes dorsalis on the one hand, and disseminated sclerosis on the other. The written answers were so far good that they showed that the candidates had generally a sufficient and reasonably accurate knowledge of the symptoms of these several affections. But there were not more than one or two out of the whole number who seemed to have any suspicion that there was any affinity or similarity between the diseases thus brought into juxtaposition; and most of them asserted or implied that the distinctions were so marked and obvious that no one of experience could possibly confound them.

The question put before the candidates on that occasion is one of two questions which I propose to consider this evening. The other relates to the recognition of general paralysis in that early stage in which as yet no thought has arisen of placing the patient in a lunatic asylum, and in which its real nature is likely to be overlooked or misinterpreted.

The question of the differential diagnosis of general

¹ Paper read before the North London District of the Metropolitan Counties Branch, Nov. 12, 1886.

paralysis, tabes dorsalis, and disseminated sclerosis is a very fair one to ask candidates whose practical acquaintance with lunacy it is desired to test; for, although typical cases of these diseases present strikingly distinctive features, and cannot well be confounded with one another, there are many cases which are not typical, and in regard to which a differential diagnosis is, for a time at any rate, difficult, if not impossible; and, moreover, it is fully recognised by alienists that there are certainly two well-marked varieties of general paralysis, in one of which the symptoms are associated with those of tabes, in the other of which the symptoms are associated with those of disseminated sclerosis. But it does not often happen, when such patients are in the lunatic asylum, that there is any real difficulty in arriving at a satisfactory conclusion with respect to the nature of their disease. Patients with simple tabes and simple disseminated sclerosis never find their way into these institutions; and when either of these affections complicates well-marked general paralysis, the predominant disease is none the less general paralysis.

The real difficulty in forming a correct diagnosis is presented during the earlier stages of these disorders, before they have yet developed the distinctive groups of symptoms by which we are accustomed to recognise them severally as specific. It is at this time that such patients come under the care or notice of general practitioners and hospital physicians. And it is at this time, when it is generally so difficult, and often impossible, that it is always important, if one can, to arrive at a definite conclusion with respect to the purport of the obscure symptoms that they exhibit, and to forecast their future.

It may be convenient, before going further, to enumerate the chief characteristics of the three diseases under consideration.

The usual symptoms of tabes dorsalis, or progressive locomotor ataxy, are as follows: impaired co-ordination of the muscular movements of the lower extremities, with abolition of tendon reflexes, numbness of the feet and legs, and neuralgic pains in them of a peculiar character; not in-

frequently similar affections of the hands and arms; and liability to pains in the stomach, rectum, and other viscera, to which the term 'crises' has been applied. Additionally, the organs of sense are often affected; sometimes there is temporary or permanent paralysis of the motor muscles of the eyes, frequently the pupils are much contracted, and usually they are insensible to the stimulus of light, though acting to accommodation; occasionally blindness or deafness ensues, or the speech acquires the scanning or divided character which is more common in disseminated sclerosis. Further, the symptoms come on gradually, and not necessarily in any definite order; so that not infrequently lightning pains, absence of tendon reflexes, or some affection of the eyes, such as a squint, precedes by a long interval the development of muscular inco-ordination. It must be added that patients suffering from tabes become sometimes liable to epileptiform attacks, and sometimes to mental derangements wholly independently of the presence of general paralysis, and that such symptoms may either precede the true tabic symptoms or arise in their course.

The symptoms of disseminated sclerosis vary largely in different cases. Still there is a large group in which they present a striking uniformity of character; and which, in a certain sense, may be regarded as typical of the disease. The symptoms in such cases are mainly as follows:—Rhythmical tremors of the head and arms, when unsupported or in use; spastic paralysis, without impairment of feeling in the lower extremities; nystagmus, scanning or divided utterance, and a tendency to lowness of spirits and some degree of mental failure. But, besides these, we are apt to meet, in different cases, with paralysis of the external ocular muscles, impairment, or loss of sight from atrophy of the optic discs; and, sooner or later, epileptiform seizures, in which rising temperature usually heralds the onset of each attack. In this case, just as in that of tabes, the development of the disease in a characteristic form is often preceded, at long intervals, by one or other of the symptoms which belong to it—for example, by temporary or permanent squint, by exaggeration of tendon reflexes in one or both legs, by tremors

in one or other hand, or by slight impediment of speech. And in this affection, even more than in tabes, mental derangement (chiefly, perhaps, dementia) is liable to come on early or to develop late. I have already pointed out that some degree of emotional or intellectual disturbance is one of the common symptoms of disseminated sclerosis, and that the supervention of epileptiform attacks is to be anticipated.

General paralysis of the insane, when fully developed, is a disease which can scarcely be misinterpreted. There are, in association, peculiar paralytic symptoms and peculiar mental phenomena. The patient is irritable and variable in temper. He has delusions, which are usually of a grandiose character, such as that he is the emperor of the world, or God Almighty, that he is immensely rich and infinitely powerful, that his mental and bodily qualities are unsurpassed and unsurpassable, that he feeds on whales, elephants, and ostrich's eggs, and so on. But with these delusions he mixes up the affairs of every-day life in a curiously incongruous manner, so that while he tells us he is as rich as Cræsus he perhaps begs for money to buy a little tobacco; or, while he boasts of being the king of kings, he will confess that his wife is a charwoman and his children attend a charity school. His mental condition, in fact, is one of associated delusions of grandeur, and failure of memory and power of reasoning. His paralytic symptoms are for the most part general. His limbs are weak and tremulous, his gait uncertain and tottering. But it is in connection with speech, and especially in the organs of speech themselves, that the paralytic symptoms are most pronounced and most striking. In the earlier periods, and in slighter cases, there is a mere trembling of the lips, especially noticeable at the beginning of sentences or words; later, the tremors involve all the muscles concerned in the movement of the lips; and yet later the convulsions are apt to extend to the muscles connected with the eyelids, eyebrows, and forehead; and in both these latter cases the spasms not only precede, but accompany, the acts of articulation. In the beginning there may be only a slight and scarcely perceptible tremor or hesitation in speech; but, after a time, utterance becomes markedly hesitating and imperfect; not infrequently

the patient stammers, not infrequently speaks as if he were sobbing, and sometimes the tremulousness and uncertainty of articulation become so extreme that it is impossible to understand him. Besides the above symptoms, which are characteristic, we find generally that the pupils are unequal and the skin greasy; often that the tendon reflexes are either exaggerated or abolished; and that the patient, at various periods in his illness, suffers from epileptic fits, which, like those occurring in disseminated sclerosis, are ushered in by rising temperature. The disease is recognised as beginning in several ways. In some cases the paralytic phenomena take precedence; and, not uncommonly, they continue for a long period unaccompanied by any obvious mental derangement. Here the tremor of the lips in speech, and the inequality of the pupils, are of great diagnostic import. In some cases the mental symptoms first appear; the patient becomes variable and excitable in temper, loses memory, leaves out words and letters and shows incoherence in writing, speaks and acts foolishly and childishly, steals, lies, acts obscenely, and perhaps gives signs of the exalted delusions which ultimately dominate the remnants of his mind. In other cases, the corporeal and mental symptoms arise simultaneously; and, not infrequently, the first indication of the patient's illness is the occurrence of epileptic fits. Occasionally, the grandiose delirium is replaced by melancholia. It is commonly thought that general paralysis for the most part proves fatal within two or three years of its onset. And this statement is doubtless true, if the disease be reckoned as commencing at the time when the patient's symptoms are first recognised as those of general paralysis. But there is no doubt whatever that in a very large proportion of cases the disease begins long before it is brought under the notice of alienists; and that in its invasion, and often for a long time, it is the friends and the family medical attendant, who alone recognise that there is something amiss, which they probably misinterpret, and the seriousness of which they probably under-estimate. My friend, Dr. Savage, of Bethlem, who has interested himself in this question, and is investigating it, finds, on close inquiry, that the confirmed symptoms of

general paralysis are often preceded by years of progressive slight deterioration of character, and of growing irritability and weakness of mind. The early indications consist in slight degrees of some of the characteristic phenomena of the declared disease; which the experienced and careful observer might possibly, even at this period, read correctly, or at any rate, would regard with suspicion.

Having made these preliminary remarks, I think I shall best accomplish the purpose I had in view in bringing the subject of the relationship of the above diseases, and of the early diagnosis of general paralysis, before you this evening, not by enumerating and weighing their various points of resemblance and difference, but by giving brief details of a few of the cases, illustrative of my remarks, which have come under my immediate observation, and for the most part such as have presented more or less difficulty of diagnosis.

The first cases I shall quote will be such as were obviously, when I first saw them, or proved in the long run to be, or are still only suspected to be, cases of general paralysis.

CASE 1.

A merchant, aged 33, consulted me in January 1881. He was stout, and a free liver, and appeared to be perfectly well. But in the previous July he had had a distinct epileptic fit in the night; in the October following he had had a second fit, also in the night; and he had had another fit three weeks before his visit to me. He had had syphilis thirteen years previously; and, discovering no better clue to the causation of his illness, or hint as to treatment, I prescribed accordingly. I heard nothing more of him until November 1883, or nearly three years afterwards, when he paid me a second visit. At this time his hands were tremulous, his gait was tottering, his tendon reflexes were greatly exaggerated; he stood (as I find recorded in my notes) as though he had defecated into his trousers; his lips trembled before and during utterance, and his speech was hesitating and drawling; his pupils were unequal; he looked about suspiciously, and he laughed fatuously and at nothing. He was clearly suffering from general paralysis. I learnt—partly from himself, but mainly from his wife—that he had had no recurrence of epileptic fits, but that he had been slowly failing mentally and bodily; that he had become forgetful and weak-

mind, emotional and irritable with his children; that he slept all the evening long, and had ceased to be in any sense a companion to his wife; yet that he had been going daily to his business in town, and had not only exhibited no delusions, but had shown no tendency to speculate, and had not misconducted himself in any way. I had at this interview, and subsequently, to explain to the wife and friends, and to the medical attendant, the unfavourable view which I was compelled to take of the patient's case and prospects, and to warn them (so to speak) of the rocks ahead. I never saw him again; but I have learnt that some time afterwards he had to be removed to an asylum, and that within the last twelve months he has succumbed to his malady. I am not sure that I ought not to have had suspicions of the true nature of this case when it first came under my notice. But there is nothing in the notes I made at the time to show that I entertained any. I do not appear to have examined his pupils, and I made no remark as to his tendon reflexes or his mode of utterance.

CASE 2.

A stonemason, aged 32, came under my care in St. Thomas's Hospital in October, 1883. The history was that for fifteen months he had been suffering from curious fits, in which he became numb and powerless, and talked and acted foolishly, but did not fall down, or apparently lose his senses; and that during the last few months he had been getting weak in body, and defective in speech. He was a healthy-looking man, without obvious loss of power in arms or legs, with little or no tremor in them, but with slight increase of knee-jerks and slight ankle-clonus. His lips, however, trembled markedly in speaking, his utterance was hesitating and indistinct, and there was some inequality of pupils. There did not appear to be the slightest intellectual deficiency; he was neither emotional nor forgetful, and neither then nor subsequently was I able to discover any evidence whatever of delusions. Two days after admission he quitted the hospital without notice, and found his way to his home in Putney. He returned, however, two days later, and stated that he had no recollection of leaving the hospital, and knew nothing of what had happened until he found himself at the Waterloo Station. While in the hospital he had occasional attacks of his fits. They came on with numbness, usually beginning in the feet, and extending thence to the rest of the body; were attended with loss of power, and, for the most part, complete loss of speech. He did not appear to be wholly insensible in them. They lasted from about half an hour to two hours, and were followed by headache. On one or

two occasions his temperature was taken before and after, and was found to be normal. He remained in the hospital for two months, during which time no change whatever in his condition was observed. For the next year the patient used to visit me occasionally at the hospital, and I had the opportunity of watching the progress of his malady. I cannot say that I detected any obvious deterioration in the condition either of his mind or of his body. But he complained to me more than once that his fits continued to recur, and that though he did not fall down he often had no recollection of what happened during their continuance, and that on several occasions while in them he had been violent and destructive, and had more than once assaulted his wife murderously. I need scarcely say that when he left the hospital, shortly after his admission, he must have been in one of these fits. I have since heard that the poor fellow has had to be removed to an asylum; but whether he is now living or dead I do not know. This case so far resembles the last, that the earliest indication of the patient's disease was the occurrence of epileptiform seizures, on which, at a later period, the characteristic defect of speech supervened. Here also, as in the other case, there was long delay in the development of mental symptoms. Indeed, I cannot say that there was any real mental impairment during the whole time he was under my observation.

CASE 3.

An officer, aged 38, a fine, handsome man, was sent to me in November of last year. He had been ailing for twelve months or more, and had been under treatment, I was told, for indigestion. Shortly before I saw him he had been on a visit to some relations in the country, who were struck with the change that had taken place in him within a comparatively short time; and with the fact that, whereas he had formerly been an excellent shot, he now invariably missed the birds at which he aimed. It was at the suggestion of these relatives, and that of a medical friend of theirs, that he came to see me. His pupils were unequal; he spoke in the drawling, hesitating manner of general paralytics, with the usual tremors of the lips and muscles of expression; his hands were tremulous; his legs trembled, especially in rising from his seat, and his tendon reflexes were much exaggerated. He told me that he was inclined to be low-spirited, that he had lost flesh and strength, that his memory was not so good as it had been, that in speaking he was apt to misuse words, and that he had had to give up writing, partly because of unsteadiness of hand, partly because he was

apt to leave out words and letters. I observed, moreover, that he was inclined to be talkative, and to say things about himself and others that were neither called for, nor such as most reasonable persons would have cared or liked to mention. I thought him somewhat weak-minded, but there was no evidence that he laboured under any delusions. There is no doubt that he was suffering from general paralysis of the insane. But, having regard to the little impairment of intellect he presented, it is not surprising that his friends, and even one or two medical men who saw him, hesitated for some time to accept the diagnosis and prognosis of his case that I felt it my duty to lay before them. I need scarcely say that further inquiries showed that his fellow-officers had for a long time observed growing impairment of mental and physical power, and growing unfitness for his duties; or add that his mental inability gradually increased, and that a few months since he had to be removed to an asylum. I do not know that even yet he has manifested definite delusions; but I know that he had become quarrelsome, and untrustworthy and feeble-minded. (The patient subsequently got worse, had to be removed to a lunatic asylum, had recurrent epileptiform attacks, and died on October 30, 1887.)

The above three cases seem all fairly typical, and, at any rate, were such as, notwithstanding the absence of delusions and mental exaltation, could scarcely be misinterpreted by anyone who was familiar with the disease. I proceed to narrate some of which the diagnosis was, or even remains, doubtful.

CASE 4.

In June, 1884, a young man, aged 32, was brought to me by his medical attendant. He had been ailing for twelve months, during which time he had been nervous, 'hysterical,' forgetful, and at times drowsy. Moreover, he acknowledged that his temper had become very irritable, that his memory was apt to fail him, that his handwriting was not so good as it had been, and that he was apt to omit words when writing letters. But he had been an active man of business, and had continued during the year to perform his usual onerous duties. He was a spare, fairly healthy-looking man. The pupils were unequal, and acted to light. There was no paralysis of the external ocular muscles. His speech was a little slow, and attended with slight tremor of the lips. The hands were slightly tremulous. His gait appeared to be natural, but the patellar tendon reflexes were abnormally brisk. I suspected the

presence of general paralysis in a very early stage, but thought the case might possibly turn out to be one of disseminated sclerosis. I heard nothing more of my patient until April, 1886; he was then brought to me for the second time. His symptoms had varied during the interval, but, on the whole, he had deteriorated. About a fortnight after his first visit to me, his eye-trouble had become aggravated, and he consulted an eye-surgeon, who observed that 'the right pupil was larger than the left, and acted neither to light nor to accommodation; and that the discs were normal.' Three months later, the same oculist reported on the state of his eyes as follows: 'The left pupil is now somewhat too large and motionless—a new symptom, pointing perhaps to slowly progressive disease about the nuclei of both third nerves.' Shortly afterwards he consulted one of the most eminent London physicians, who elicited a history of syphilis, and ordered him to take mercury. This treatment, it is said, was followed by some amendment; but his irritability of temper continued to increase, and he had been liable to attacks of depression, rapidly alternating with fits of boisterous spirits and boastfulness. He had been quarrelsome and unmanageable at times, and, though not lavish in other respects, had been spending largely on his personal adornment. His memory had been very defective, but he did not seem to have had any delusions. He stated that he wrote better than he formerly did, and that he did not now make mistakes. He had still been going on with his occupation. His tongue trembled a little when put out; his lips also trembled slightly in speech. His articulation, however, was perfect while he was speaking quietly, but became hesitating and indistinct when he was excited; at which time, too, the tremors would extend from his lips to the rest of his face. The pupils were unequal, the right being the larger; and they both acted sluggishly to accommodation, but not at all to light. There was no noticeable tremor of the arms. No inco-ordination in walking could be detected, and he could stand with his eyes shut. The knee-jerk in the right leg was, if anything, a little exaggerated; it was wholly wanting on the left side. He had had lightning-pains in his legs for a few weeks. There was no loss of sexual desire or power. I have only, so far as his history is concerned, to add that, two months after I saw him, he was removed to a lunatic asylum, where I believe he now is. [I have since heard that he died there very shortly after admission.]

I think there can be no reasonable doubt that my original surmise was correct, and that this case was really one of general paralysis. But, just as in the other cases I have narrated, there

was no grandiose delirium—no delusions. And the paralytic phenomena presented curious changes; the ophthalmoplegia interna varied from time to time, and the tendon reflexes in the legs, which were at first exaggerated, in the course of time diminished in one leg and disappeared absolutely in the other. There were, in fact, associated with fairly characteristic signs of general paralysis, both symptoms of tabes and symptoms of disseminated or lateral sclerosis.

CASE 5.

A gentleman, aged about 80, consulted me first last February. About ten years previously he had had syphilis, not followed by secondaries. Five years later he had had gonorrhœa, from which a stricture resulted. For four or five years he had been liable to shooting pains in the thighs, knees, and legs, which came on irregularly, lasted a variable time, and were often very severe. He had been married three or four years, and since then had resided abroad; and a year and a half or two years before I saw him he had been nursing his wife during a very alarming illness which followed her confinement, when, without warning, he was attacked with an epileptic fit. About twelve months ago he came back to England, and on his voyage had a succession of similar fits, and was unconscious for a fortnight, after which his memory was much impaired. He improved, however, very much in this respect, and was able on his arrival in England to undertake clerical work. A few weeks ago he had another epileptic fit, not followed as the previous group was by loss of memory. He had suffered from lowness of spirits, and ever since his illness aboard ship has lost all sexual desire and aptitude, and has been liable to attacks of coldness (with goose's skin) involving the left half of the body only, coming on suddenly and terminating in heat of surface but no sweating. He stated that he had lost flesh, but he was in fair condition. His expression was dull and sad; his face was greasy; his pupils were unequal, neither of them acting to light, and the left (which was the larger) not acting to accommodation. The optic discs were normal and the sight good. There were no tremors in the hands, there were no traces of tendon reflex in either leg, and no numbness. He could walk without difficulty, and could stand with his eyes shut. He had no defect of speech or writing, but I was inclined to think his lips trembled slightly previous to utterance. Beyond the facts that the patient was dull and low-spirited, and not very companionable, and that his memory (though it had improved) was still not quite so good as it formerly was, I was unable to elicit any evidence of mental derangement. I saw him occasionally during the follow-

ing six months, but nothing occurred to throw any further light on the nature of his disease. There was a little variation in the symptoms from time to time; occasionally he complained of pains at the back of the head and neck, and for the last month or two his water had run away from him occasionally both in the day and when asleep. I learnt later that he had consulted an oculist ten years previously for ptosis on the left side, of which there were still occasional traces. That this patient is suffering from some chronic degenerative change in the nervous centres there can, I conceive, be no doubt, but whether he will ultimately find his way into an asylum cannot yet, I think, be positively affirmed or denied. I suspect that the case will prove to be one of general paralysis.

[This gentleman became maniacal about a fortnight before his death, which occurred on December 4, 1887. At the post-mortem examination there was considerable excess of subarachnoid fluid, and apparently wasting of the convolutions, with some hypostatic congestion of the pia mater behind; the cortex was pale, the substance of the brain firm and healthy; the cord was normal in size and consistency, but it presented unsymmetrical patches of white opacity chiefly situated in the white matter. There was no disease of muscles, and no trace of tumours. The rest of the body was not examined. It is probable that there was some disseminated sclerosis in the cord. The condition of things in the brain was compatible with general paralysis.]

CASE 6.

An officer, aged 33, consulted me, at the instance of his friends, in January, 1884. He was a remarkably fine, handsome, healthy-looking man, who had obtained sick-leave six months previously, and returned to England from a tropical climate. He had distinguished himself greatly, and had obtained high promotion at an early age. For the last three years he had been resident in one locality; and for the last year or two of that time had presented symptoms of mental disturbance. He had continued to do his work to the last; but he had become irritable, variable in temper, quarrelsome, taking dislike to his friends, showing jealousy of the success of others, complaining of being neglected, expressing a desire for active employment, but neglecting the work which he had to do. As an example of his behaviour, I am told that, on one occasion, he, without any apparent reason, seized upon a favourite dog of his and threw it on to the ground with great violence, then almost immediately repented of what he had done, took it up, fondled it, and seemed greatly affected. Since he had been in

England he had shown something of the same quality of mind; he had been vacillating and irritable, and particularly had manifested a great tendency to fall in love. Indeed, when he called on me, he had already been entangled in two or three love affairs; and, on the spur of the moment, had engaged himself to a girl, whom he had since almost as suddenly discarded. His family now, as previously his friends abroad, were not satisfied as to the soundness of his mind; but he had never shown any delusions, nor had he done anything specially or noticeably outrageous. I could discern very little amiss with him; he was perfectly courteous and gentlemanly, talked freely with me about his condition, said that he was sleepless, and expressed regret at his behaviour to the girl whom he had jilted. It seemed to me, however, that there was a want of healthy reticence in regard to himself and his own affairs, and that he was inclined to be over-garrulous. There was some inequality of pupils but no sign of affection of speech, or of any form of paralytic affection. I saw him again about a month later. He looked well; but it appeared that he had continued sleepless, and that he had been alternately low-spirited and excited. He had spent the previous three nights at balls, and told me that at one of them, much to his annoyance, a girl had proposed marriage to him. I saw him on one or two subsequent occasions, and also some of his relatives, and was instrumental in obtaining for him extension of leave. But I lost sight of him about the middle of 1884, and heard nothing more until some two or three weeks ago, when happening to meet a medical man who had come over to England from the town in which my patient had previously been, and was now again stationed, I asked him if he knew anything of him, and then learnt from him that he had married while in England, and taken his wife abroad with him, and that mentally he still showed all that vacillation of character, violence of temper, and quarrelsome disposition which he had shown before coming to England—qualities which were foreign to his original and true character.

That this patient has been mentally unsound for some years is obvious; but whether he will in the course of time become a general paralytic is, I take it, uncertain. All I can venture to assert is that the symptoms, so far as they go, are compatible with the coming on of that disease; and they are, I believe, such symptoms as one finds, on looking back into the history of general paralytics, they often present before the true nature of their malady is recognised. I need scarcely add that the symptoms in this case were entirely mental; and that obviously the question of relationship to *tabes* or any such affection, did not and does not arise.

[CASE 7.—A gentleman, aged 25, consulted me on March 3, 1888. He had been liable to megrim. For about five years he had been suffering from impairment of appetite, flatulence and uneasiness after food, and he had lost flesh and strength; but his dyspeptic symptoms had always been vague. He believed that about two years ago he had been poisoned by water containing lead; at any rate afterwards for a few months he had suffered from constipation and colicky pains. He stated that he had had an attack of typhoid fever a year previously, which had laid him by for about six weeks; that he had never quite regained his previous health since then; and that a few weeks before I saw him he had had inflammation of the abdomen lasting for two or three weeks. He was spare and delicate-looking. I could discover no trace of disease within the chest or in the abdomen; and his urine, which had a specific gravity of 1012, was free from sugar and albumen. It struck me that his speech was somewhat slow and hesitating; but he declared that it was normal. I happened to touch him with my finger sharply and unexpectedly, when a sudden convulsion passed through the trunk and limbs. Afterwards I repeated the same operation intentionally, and always with the same result, and he acknowledged that for some time past he had been easily startled. On examining his tendon reflexes I found them all much exaggerated; and that the attempt to elicit them always caused a general convulsive movement. But I could not obtain either ankle or knee clonus. He walked without difficulty and could stand with his eyes shut. The pupils were large, and active to light and accommodation. There was no defect of any of the senses; no impairment of memory, difficulty in writing, or failure of sexual desire or capacity. He informed me additionally that he slept badly; that he had occasional tremors of the limbs and of the head; that his legs at times would stiffen; and that he suffered now and then from rheumatic pains in his limbs.

I suppose few persons will think I am justified in regarding this as a case of early general paralysis of the insane; and very likely that view may be erroneous. At the same time the remarkable sensory reflex phenomena which the patient presented, in combination with general excessive tendon reflexes, constitute a striking characteristic of one well-marked variety of general paralysis. I do not recollect (possibly, no doubt, for want of experience or of close observation) to have observed these combined phenomena under other circumstances. The patient's other symptoms, with the exception that there seems to have been progressive loss of strength and flesh, were vague and unsuggestive. But, it may be remarked that while they do not point to any other particular disease, they

are by no means opposed to the view of the case which I venture to suggest.]

I proceed now to quote a few cases of what I regard as locomotor ataxy, but in which the specific symptoms were so far complicated with others referrible to the brain, that I can conceive that the diagnosis of locomotor ataxy might be disputed.

CASE 8.

The case I am about to narrate was included in a paper which I published in the thirty-first number of *Brain*. It is that of a musician, who was admitted into St. Thomas's under my care in 1880. He was then between 30 and 40 years of age. He was suffering from obscure symptoms, the meaning of which I failed to interpret. He was extremely nervous and irritable, and gave me the impression of being hysterical. Whether I did not trouble myself to investigate his complaints thoroughly, or whether I did investigate and could discover nothing to explain his symptoms, I cannot recollect. The case, however, made little impression on me at the time, and I should have forgotten all about it but for its subsequent history. Late in the year he called at my house, complaining of 'tightness in his leg,' but he walked without difficulty; and I still failed to discover what was the matter with him. He was still nervous and emotional, and I thought hysterical. The next time I saw him was in 1883; he was then distinctly ataxic. He was suffering from lightning-pains, numbness in the feet, and inco-ordination in walking. He had complete ophthalmoplegia interna, and on the left side partial ptosis. He suffered also from gastric crises. He was still nervous and hysterical. Since then he has gradually got worse. The ataxic symptoms have increased; considerable paralysis of the external ocular muscles has taken place; he has been complaining not only of crises referrible to the stomach, but of others referrible to the rectum, and of a peculiar spasmodic cough. His mental condition has not changed. I have little doubt that if I had investigated with sufficient minuteness and care when the patient first came under my treatment I should have discovered the presence of phenomena pointing to the true nature of his malady. And I may add that, even if at that time the discovery of ataxic symptoms had led me to think that the hysterical manner of the patient pointed to the coming on of general paralysis, the subsequent progress of his case would have proved my surmise to be erroneous. The case is essentially one of complicated tabes.

CASE 9.

The next case is that of a gentleman, aged 39, whom I saw in December, 1883. He had been ailing for seven years and his illness had apparently been induced by long-continued over-work and anxiety. His first sufferings were mental. He became low-spirited, suicidally inclined, and was unable to apply himself to his business duties; noises worried him; he had a peculiar dread of riding in omnibuses, cabs, or railway carriages, and of walking over London Bridge. But he had no delusions, and kept most of his sufferings to himself. These symptoms, varying in severity, but never wholly disappearing, continued for five years, when they left him. Shortly after the beginning of his illness he began to suffer from a sense of weight and soreness in the right hypochondrium. This soon became almost constant, but presented frequent acute paroxysms, often induced by moving about, and also, as he believed, by taking food. When specially severe it would shoot from the hypochondrium into the lower part of the belly. The pain had tended to increase from the time of its first appearance; and during the last year or two had been so intense and a source of so much misery to him that he had been compelled to give up business altogether, and had been almost entirely confined to the house. It is noticeable that his appetite had never failed, yet that he had been in the habit of taking very little food, for fear of increasing pain, that he had never suffered from sickness or flatulence, and that, indeed, he had never had any of the usual symptoms of dyspepsia. Further, he had never shown any symptoms of hepatic, renal, cardiac or pulmonary disease; nor had there ever been any obvious defect of the organs of special sense. He had lost flesh latterly. It appeared on further inquiry that for some few months he had suffered from 'rheumatic' pains down the right leg, mainly a kind of soreness in the muscles, and that he had experienced a little difficulty in using the limb. He was a pale, thin man. He had a soft, flaccid abdomen, which presented no tenderness anywhere, and admitted of easy exploration. There was no discoverable tumour, or enlargement of any organ. He had an umbilical rupture, about the size of a pea, which could be readily reduced. His pupils were equal, and acted to light and accommodation. His speech was unaffected. He had no numbness or tingling anywhere, no muscular tremors; but in walking the movements of the right leg were a little uncertain and awkward. There was total absence of tendon reflexes on both sides. This fact had been recognised three

or four years previously, but its significance apparently had not been appreciated. Formerly the knee-jerks had been brisk. The discovery of ataxic movements in the right leg, and the absence of tendon reflexes led me to make further inquiries; and I elicited that although he could walk fairly well in the daytime, for some year or two he had shown great unsteadiness in walking, and even in standing, in the dark; and that not infrequently, when washing his face at the washhand-stand, he would become so unsteady that his wife had to run to him and support him. The patient died about a year later. Although many of the symptoms in this case, and their sequence, were unusual, there can be no doubt that the patient suffered essentially from *tabes dorsalis*, and that the hypochondriac pain which had continued for six or seven years when I saw him was a form of the gastric crisis common in that disorder. It is interesting that the specific tabic phenomena should have been ushered in with prolonged mental derangement. It is clear, however, from the progress of the case, that there was never, even on this account, any sufficient reason for regarding the disease as general paralysis.

CASE 10.

Nearly five years ago I saw a gentleman, aged about 35, who for several years had had marked and increasing symptoms of locomotor ataxy, including momentary pains in the lower extremities, absence of tendon reflexes, loss of co-ordination in the movement, and numbness, of the lower extremities, and gastric crises; and in whom the symptoms had become so severe that he had been compelled some little time before I saw him to retire from business. He had recently been for a voyage to Australia, and while at sea he experienced peculiar attacks. These at first consisted in an indescribable pleasurable sensation at the epigastrium, which he was tempted to encourage. But after a while the epigastric feeling became disagreeable, and was followed or accompanied by a strange mental condition, in which it seemed to him that everyone became two or three times as tall as natural. During these latter attacks his face became livid, and his eyes fixed; and his coming to was attended with smacking of the lips. He never cried out or fell in the attacks, and believed he had never lost consciousness. Those who had the opportunity of observing him at these times thought differently. I verified the facts of his gait being ataxic, and of the absence of knee-jerks. The pupils acted to light and accommodation. I have not seen the patient since, but I believe I heard some little while ago that he had improved a good deal. Now here, again, we

have clearly—at least, so I think—a case of tabes ; but it is peculiar from the circumstance that the pupils did not present the Argyll-Robertson phenomenon, and from the supervention of fits which are so common in general paralysis, so rare in tabes. There was no mental defect, or affection of speech, and I think, therefore, no sufficient reason to suspect the coming on of general paralysis.

CASE 11.

Another case, not unlike the last, came under my observation nearly four years ago. The patient was a gentleman, aged about 54, who had suffered for several years from lightning-pains in the legs, and for about a year from occasional severe gastric crises. But he had had no difficulty whatever in walking or standing. He was thrown off his horse the year previously, but apparently sustained no injury. A year later he fell off his horse, probably in a fit. And since then he had, on two or three occasions, suddenly become insensible, and remained insensible for some time. He had lost flesh during the last few months. The pupils were unequal, and presented the Argyll-Robertson phenomenon. The patellar tendon reflexes were entirely absent. But he had no numbness in hands or feet, walked naturally, could stand with perfect steadiness when his eyes were shut, and could walk and stand in the dark without tottering. His speech was perfect, and there was no sign whatever of mental impairment. Again, notwithstanding the occurrence of fits, and certain other peculiarities as regards symptoms, the case must, I think, be regarded as one of locomotor ataxy.

It would have been easy for me to multiply cases, and even to quote many specially interesting cases, of tabes, disseminated sclerosis, and general paralysis, had my object been simply to lay before you striking and typical examples of these diseases. My aim, however, has been, as I explained at the beginning of my address, to show how important it is that medical men, and especially those in private practice, should not only be acquainted with these affections in their fully-developed phases and typical forms, but should recognise the fact that complex and puzzling cases are of frequent occurrence ; and that, especially during the earlier periods of their history, their true nature is often extremely difficult, often impossible of determination ; and yet that, even at this time, there may be apparently trivial yet really valuable

signs for those who have the wit or knowledge to read them correctly. I may add that, in looking back to my past experience, I can recall some cases that a few years ago I regarded as examples of locomotor ataxy, which I am now convinced were examples, not of locomotor ataxy alone, but also of something still more serious, which at the time I overlooked; and that during the last two years I have, on two occasions seen, in hospitals which I chanced to visit, patients whose cases their physicians looked on as cases of tabes dorsalis; but whom, I am certain, anyone skilled in lunacy would have set down as general paralytics.

XXV.

ON SO-CALLED 'PAINFUL' PARAPLEGIA.¹

WITHIN the last few months I have seen, in association with two or three medical practitioners of great eminence, a case which has been, and remains, to them as well as to myself deeply and painfully interesting. A gentleman, a little over seventy years of age, who had hitherto enjoyed good health, was, about five months before I saw him, attacked suddenly, while playing at billiards, with a sharp pain in the lower part of the dorsal or upper part of the lumbar region of the spine. The pain, which was paroxysmal, increased in severity and frequency, and latterly became extremely severe and almost unbearable, so that he was compelled to take to his bed. On the occasion of my visit he was probably at his worst; his pains were excruciating, and he could scarcely be prevailed upon to shift his position in bed, or to permit an examination. The pains were described as being momentary, stabbing, or lightning-like, and resembling those of tic; they were induced by any movement, and even by manipulation of the back or upper part of the belly, but often also came on without any obvious cause. They were referred mainly to the region of the lower lumbar vertebræ and right loin, but were apt to shoot in various directions; and often these attacks made him cry out. On examination of the spine it appeared to be a little curved, and in the lower part of the dorsal region there was an area of tenderness involving one or two vertebræ. It was thought that these vertebræ were unduly prominent. The abdominal muscles were extremely rigid; and on deep pressure on the right half of the scrobiculus a severe paroxysm

¹ *St. Thomas's Hospital Reports*, vol. xii.

of pain was at once induced. He complained of occasional aching pain along the outer aspect of both thighs, but this, he stated, was of old date. It may be added, that he was quite free from cardiac disease; that he had never had any recognised renal or urinary trouble; that he had an old inguinal hernia, and suffered from habitual constipation; that he had no paralysis, and no tumours to be felt anywhere about his body; and that he had never had gout or syphilis. He had latterly, however, lost appetite and flesh, and strength.

What was the nature of this gentleman's malady? Was it renal? That could hardly be, for the patient had been carefully watched, and no unhealthiness of urine had ever been detected; he had never had difficulty in passing it, and never any pain specially referred to the bladder, urethra, or testicle. Was it simple but aggravated neuralgia? The pain was unquestionably neuralgic; and neuralgic pains of the most intense character, and unconnected with discoverable organic disease, are certainly not limited to the trifacial and other sensory nerves distributed to superficial parts. I recollect very well a middle-aged lady who suffered for many months from the most excruciating paroxysmal neuralgic pain, referred variously to the left renal and left ovarian region. She was examined most carefully from time to time by obstetric and other physicians, including myself, without any of us being able to discover the least sign of visceral disease to account for her sufferings. And she was neither hysterical nor gouty. That must have been ten or fifteen years ago at least, and she is now in the best of health. No doubt his symptoms like hers might have been due to simple neuralgia, but it must be admitted, I think, that this view of his case was at least highly improbable. The other alternatives that suggested themselves were caries of the vertebræ, aneurysm, and carcinoma or some other form of morbid growth. It is needless to discuss the relative probabilities of these alternatives. It is sufficient, perhaps, to point out that caries may certainly come on in old age, and that it may be attended with severe pain, but that such excruciating agony as our patient suffered from is a much more frequent consequence of aneurysm or cancer, and that these affections are commoner in advanced life than

caries is. I leant to the belief that the patient was suffering from carcinoma (to employ that word in its clinical sense), and anticipated that paraplegic symptoms would ensue.

Three months later I saw him again. I learnt that under the treatment employed, namely, the persistent use of cannabis, his pain had diminished, and at the end of a month had disappeared; that then he had got up, had walked about, and even strolled in his garden; that, probably in consequence of this, pain and weakness in the back had returned, and he had to take to his bed again; and that two or three weeks later symptoms of paraplegia, which rapidly increased, first showed themselves. At my visit I found him apparently much stronger, much plumper, much more cheerful, and altogether much better than when I saw him before. He still, however, had some tenderness in the back, still complained of pain in the upper sacral region, from whence it extended to the hips and to the neighbourhood of the umbilicus, where also there was tenderness on deep pressure. But no abdominal tumour could be felt, and there was no tumour elsewhere. The most important feature of his case now, however, was the presence of paraplegia. He had no voluntary power over his lower limbs, beyond the capacity to move very slightly the toes of his right foot. He complained of a little numbness in his feet, yet he had nowhere any actual absence of sensibility. The muscles were soft and flaccid; there was only a slight trace of plantar reflex; the tendon reflexes on the left side were wholly absent, and the patellar reflex on the right side was obtainable with difficulty. He had no power over his bowels, and his water had to be drawn off periodically by the catheter.

Was the mystery of this case more easy of solution now than when I first saw it? I will only remark, concerning it, that the extreme pain from which the patient had suffered, and the paraplegia characterised by wasting and flabbiness of muscles and disappearance of reflex phenomena, pointed rather to mischief involving nerves after their emergence from the cord than to disease affecting the cord itself; and, in place of pursuing the discussion of the significance of the phenomena presented by it, proceed to quote a series of cases, which, I conceive, will serve to explain and justify the interpretation I

was inclined to put upon the patient's symptoms in the first instance, and in which the onward march of events has hitherto confirmed me.

In the first of the ensuing cases the pains from which the patient suffered about the hips, thighs, and legs, associated as they were not only with loss of power over the lower limbs, but with wasting and flaccidity of muscles and absence of tendon reflexes, led me to assume from the beginning that the case was one of paraplegia due to malignant disease involving the lumbar vertebræ. This opinion was sustained by the progress of the case; for the enfeeblement and wasting of muscles increased, the tendon reflexes remained in abeyance, and the electrical reactions of degeneration became developed—phenomena pointing to involvement of the nerve-trunks connected with the lower extremities; and finally, shortly before death, symptoms appeared suggestive of malignant disease of the respiratory organs. The post-mortem showed malignant disease, mainly about the bodies of the second and third lumbar vertebræ, but distinctly involving the nerves on the right side, and reaching to, though less obviously affecting, those on the left side.

CASE 1.—Malignant disease connected with lumbar vertebræ, and in posterior mediastinum; paraplegia; pulmonary symptoms. Death; autopsy.

Charles H., a labourer, æt. 66, was admitted under my care on October 7, 1882. He has been a soldier, and had various maladies while abroad. But there is nothing in his former history to throw light on his present illness. This began in June last with pain referred to the right hip, whence before long it extended down the thigh and leg, and in four or five weeks attacked the left hip also. He gradually lost power in the right lower extremity, and has latterly been unable to use it in walking, or even to stand on it. He has retained fair power in the left leg.

On admission he appears to be a man of large frame and healthy aspect, but his limbs, and especially his legs, are small. He complains of aching and burning pains, worse at night, which shoot at times into both legs. These pains run down the back of each thigh and along the outer part of each leg to the ankle, and occasionally along the outer side of the foot to the little toe. The

pains lately have been more severe on the left than on the right side. The legs feel numb and heavy, more especially the right; and he complains specially of numbness and some soreness over the inner aspect of the right thigh and leg. The muscles of both legs are very small and flabby, and both limbs (the right much more than the left) are weak. No special tenderness along sciatic nerves. The tendon reflexes are quite absent in both legs. Plantar reflexes very slightly marked; cremasteric reflexes not obtainable; abdominal reflexes present. No further evidence of disease. Urine, sp. gr. 1035, containing neither sugar nor albumen.

The pain continued very severe, and could only be rendered bearable by the use of morphia, which was administered periodically by subcutaneous injection.

About a week later it was observed, that he had some difficulty in passing water, that his pain was now limited to the inner part of the right thigh from the groin to the knee, and that his tongue was fissured. On the 17th the burning pain implicated the inner aspect of both thighs; and on the 21st the pain, which he described as aching, affected the right hip, whence it extended down the inner side of the thigh into the knee.

Thenceforth the patient's pain, which varied in severity and often came on in paroxysms, was referred mainly to the right hip and thigh, and occasionally also to the corresponding side of the scrotum, in which there was (he said) scarcely any sensation. The muscles, especially those of the right lower extremity, became somewhat more flabby and emaciated than they were on admission, and the limbs quite incapable of any active movement. The left leg also lost power, but he could always move it pretty freely; there was some numbness in the right leg, but no absolute loss of feeling.

On the 31st Dr. Kilner tested the electrical reactions, and found them as follows:—The muscles of both lower extremities required an extremely powerful induced current to cause any contraction at all. The reactions with the constant current were in both legs the reactions of degeneration, but the evidences of degeneration were most marked on the right side. He complained occasionally of burning pain in the bladder when he wanted to make water, and after he had been in the hospital a fortnight or so the catheter had to be regularly employed. The urine, however, remained healthy to the last.

His case presented no new feature until November 1, when he first spat a little blood. This kind of expectoration continued for a few days, attended with cough, when, on examination of the chest, it was found that the lower half of the left pleura was apparently

full of fluid. He had been gradually getting weaker and thinner, and at this time was extremely ill.

The thoracic symptoms continued. Diarrhœa with involuntary escape of motions came on; his temperature rose; his pulse became rapid and very feeble, his respirations frequent and shallow; and he died exhausted on November 7.

No abdominal tumour was ever discovered.

Autopsy.—The left pleura contained about two pints of dark turbid fluid, the right a few ounces, and in both cases there were evidences of recent pleurisy. In the posterior mediastinum was a mass of new growth, mainly around the root of the left lung, but encroaching on the posterior part of the pericardium and some of the pulmonary veins. The left lung was congested, and its main bronchus partially obstructed. The middle part of the right lung was in a state of red hepatisation. The heart was healthy. The abdominal viscera were all healthy. But behind the peritoneum, and corresponding mainly to the bodies of the second and third lumbar vertebræ, and moulded upon them, was a nodulated tumour. This, though extending to the left, was chiefly developed to the right of the middle line; and on this side it extensively implicated the psoas magnus muscle, together with the anterior crural, genito-crural, and obturator nerves, and the lumbo-sacral cord. The tumour on the left side reached the nerve-trunks, but did not distinctly press upon them.

The brain and cord were fairly healthy.

The muscles of both legs were pale and atrophied.

The tumours appeared to be sarcomatous.

The second case was one, concerning the nature of which, during life, there was scarcely room for difference of opinion. The patient had had his arm amputated at the shoulder-joint for sarcoma of the humerus, and fourteen months afterwards he was attacked with numbness in his legs followed rapidly by loss of power in them and impairment of control over his rectum and bladder. He suffered also from severe pains about the loins and hips, and down the legs; and the muscles, on the whole, were flabby. It is interesting, however, that at first in both legs the tendon reflexes were well-marked, and attacks of stiffness were apt to come on. But as the case progressed the muscles wasted, the tendon reflexes disappeared entirely from the left side, probably also from the right side, and the reactions of degeneration were found to be present. An

interesting feature in the case was that, while under treatment, a spontaneous fracture of the left thigh occurred, due to the development of a sarcomatous growth in its substance. At the post-mortem examination a largish growth was found situated over the third, fourth, and fifth lumbar vertebræ, which projected also from the back of the bodies of the vertebræ into the spinal canal, and thus involved not only the cauda equina, but the lumbar nerves after their emergence from the inter-vertebral foramina. A curious fact, revealed by the autopsy, was that the body of the fourth vertebra had (with exception of a thin horizontal film of bone) wholly disappeared, the space it had occupied having become filled up by sarcoma which had involved or displaced the inter-vertebral cartilages above and below it.

CASE 2.—*Amputation of left arm for sarcoma of humerus; secondary sarcoma of lumbar vertebræ, causing paraplegia; and of left thigh bone, permitting of spontaneous fracture, followed by suppuration, &c. Death; autopsy.*

William R, a gardener, æt. 39, was admitted under my care on November 21, 1882. About fourteen months ago his left arm was amputated at the shoulder-joint for a large sarcomatous tumour of the humerus, and he left the hospital after five months well and without sign of secondary growth. He remained well until six weeks ago, when he began to suffer from pain in the hips and thighs. A few weeks ago he complained of numbness in the lower extremities, from the buttocks downwards; also he had pain in the small of the back, and became so weak in the legs as to be unable to walk without assistance. His urine began to escape involuntarily a few days before admission.

He is a pale, spare, unhealthy-looking man, complaining of aching pains in both hips, worse at night. He is unable to stand alone, but can move his legs as he lies in bed. The muscles, with the exception of the extensors of the legs on the thighs, which seem strong, are small and very flabby; occasionally, however, they stiffen. This is especially the case in the right leg, which sometimes trembles. The plantar reflexes are feeble, and the cremasteric and abdominal reflexes absent; the knee-jerk is brisk in both legs, but there is no ankle-clonus. There is some impairment of sensation from the knees downwards. The stools and urine are passed under him, and he does not know when this occurs. No tender spot or tumour can be detected about the pelvis or abdomen

or spine. Thoracic organs healthy. Urine, sp. gr. 1032, alkaline, uratic, and slightly albuminous.

There was very little material change in his condition for some weeks after his admission. Many of the symptoms, indeed, were variable within slight limits. The pain was pretty constant, and generally worse at night, and was often so severe as to prevent him from sleeping, unless relieved by morphia injections. It was generally in the hips, at first mainly in the right, subsequently mainly in the left, and at times it extended to the sacrum or to the knees and feet, or affected the front of the thighs. The paralysis on the whole increased, and the muscles were for the most part flabby and seemed to get smaller. He lost power almost absolutely over the feet, which latterly hung down powerless as he lay in bed. The patellar tendon reflex became lost in the course of three or four weeks in the left leg, but still remained fairly well-pronounced in the right. This leg also was still stiff at times. Sensation varied in the lower part of the legs, but never wholly disappeared. His voluntary relation to the evacuation of his bladder and bowels also varied. At times he could exercise a little control, at times (when he had no such power) he knew that the urine or stools were about to escape, and at times (as at first) he had no knowledge of the action of his emunctories. The urine was for the most part alkaline and of high specific gravity, and sometimes contained a little albumen. On two or three occasions he suffered from diarrhoea, which had to be restrained by astringent medicines or morphia suppositories. Temperature normal. Appetite fair. He slept well, as a rule, under the influence of morphia. He got weaker, no doubt, but this change was scarcely appreciable from day to day or even from week to week. Late in January Dr. Kilner tested the electrical condition of his legs carefully, and found that on both sides the thigh muscles required a much stronger induced current than healthy muscles to make them contract, and that a much feebler constant current than in health caused contraction, the relative influence of making and breaking circuit being reversed. The reactions of degeneration were most marked on the left side.

On January 29, the patient was turning himself in bed by means of a pulley when he felt a crack in his left thigh. This was found to be due to a sudden fracture of the shaft of the femur a little above its middle. There had been no previous symptoms pointing to disease of this bone.

From this time forward he was very ill. He suffered not only from his old pain in the right hip and down the right leg, but from

pain referrible to the fractured thigh. This became inflamed, and a swelling formed in its upper half, which after a while fluctuated, and at the end of about a fortnight was found to be resonant on percussion. On opening it fetid gas and thick offensive pus escaped. A bed sore had been forming on the buttock for some time, and when the abscess was opened had become very extensive and deep. It was supposed that the decomposition of the fluid in the femoral abscess might have been due to some kind of connection between it and the bed sore. Some gangrenous patches appeared about this time on the toes of the left foot, and gradually increased in size. He also began to suffer from cough, with sanguinolent expectoration. All the above symptoms continued, associated with rapidly increasing feebleness, a temperature which was very variable (for the most part ranging between 100° and 103° , but occasionally sinking to 95° or rising to 105° and upwards), and occasional rigors. He died on February 26.

Post-mortem Examination.—The abdominal viscera were generally healthy. Over the third, fourth, and fifth lumbar vertebræ was situated a tumour, moulded to their surface, rounded in outline, measuring about 3 inches transversely by $2\frac{1}{2}$ inches vertically, and about $\frac{3}{4}$ of an inch in thickness. It extended a little more to the left than to the right, and was divided into two lateral lobes by the aorta and vena cava, which lay in a groove upon its anterior surface, and bifurcated just above its lower border. The nerves of the lumbar plexus on the right side were in close relation with the edge of the tumour, but not distinctly pressed on by it; those on the left side, however, were evidently involved to some degree in it, and compressed by it. On opening the spinal canal an irregular growth was found springing from the situation of the body of the fourth vertebra, filling up the anterior half or more of the canal, and compressing the cauda equina. On making an antero-posterior vertical section of the vertebræ it was found that the growth on their anterior aspect was continuous with a similar growth, which extended through the vertebral column, and thus became directly continuous with that encroaching on the spinal canal. The condition of things as regards the vertebræ was peculiar. The body of the fourth had almost entirely disappeared, being indicated only by an indistinct horizontal plate of bone, less than a line thick, which separated the intervertebral cartilages above and below it. These were together about $1\frac{1}{2}$ inch thick, and although presenting many of the characters of intervertebral cartilage were clearly infiltrated with adventitious growth. The arches and processes of the fourth vertebra remained unaffected. There was no angular curvature. The tumour was a small-round-celled sarcoma.

The third case, also, was one of well-marked paraplegia, accompanied by very severe pain in the lower part of the back, and the presence of a growth (which was easily recognised) in the venter of the left ilium, on which side the paraplegia was most marked. Here the tumour appeared to have originated in the periosteum of the ilium, both beneath the iliacus and beneath the glutei, and to have extended upwards in front of the lumbar vertebræ, and backwards into the concavity of the sacrum. There were many secondary growths in distant regions. The morbid anatomy of the case, however (which was very interesting), is in some respects given in fuller detail in the eleventh volume of the 'Pathological Transactions,' p. 125.

CASE 3.—*Sarcoma of periosteum of os innominatum, with secondary growths in liver, kidneys, lungs, and elsewhere; paraplegia. Death; autopsy.*

Maria C., æt. 16, was admitted under my care on September 29, 1859. She had had good health until three months before coming into the hospital. She then began to fail, but only became seriously ill a month since. She then first complained of pains in the lower part of the back, which soon became constant and severe. About the same time she noticed swelling and tenderness about the left hip-joint; and shortly afterwards her legs became weak and their sensibility impaired.

On admission she was in a febrile condition, with rapid pulse, furred tongue, and constipated bowels. There was imperfect paraplegia, with some loss of sensation, especially marked on the left side, and a tumour on the same side connected with the ilium, and supposed to be a periosteal growth. The paraplegic symptoms increased upon her slowly after admission, and the catheter had to be employed; the tumour, also, of the ilium grew larger. She gradually sank, bed-sores formed, the feet became cedematous, and she died worn out on December 18.

Post-mortem Examination.—The whole of the left iliac fossa, except its anterior superior corner, was occupied by a large rounded growth, which protruded and involved the iliacus internus muscle, and, projecting from below its lower margin, extended into the concavity of the sacrum, forming there two or three rounded masses. It extended also backwards and upwards over the anterior surface and sides of the lumbar vertebræ. A similar and nearly equally large mass occupied the posterior two-thirds of the outer surface of

the ilium, protruding and involving the glutei muscles. The inner and outer masses did not appear to be continuous either through any of the notches or over the crest of the ilium. They had both originated apparently in the periosteum, and had encroached on the bony tissue, which was consequently very thin and fragile. The inner and outer tumours were together nearly as large as a good-sized cocoa-nut.

Numerous secondary growths were present in the liver, kidneys, retro-peritoneal glands, lungs, and mediastinum, and the mucous membrane of the bladder was much inflamed. The growth had the characters of what is now known as round-celled sarcoma.

The case last cited stands, both clinically and from its morbid anatomy, midway between the two cases that precede it and the two that follow; for while, as in the former, there was paralysis of both legs and a growth spreading over the surface of the vertebræ and so implicating the lumbar plexus, there was also, as in the latter, a tumour springing from the periosteum of one ilium, which was probably the primary and most important lesion, as it was certainly the most prominent feature of the case during life.

In the first of the two ensuing cases the patient was attacked with pain in one buttock and along the outer side of the corresponding thigh, which might have, and I believe had, been mistaken for sciatica. But rapid loss of power and wasting of the buttock and limb ensued, and before long a lump (the nature of which was not clear) was recognised apparently springing from the bone at the back of the hip-joint. This was the earliest proof of the growth of a sarcomatous tumour, which, by involving the great sciatic nerve, had caused paralysis and wasting in the lower extremity, and which, before the patient's death, had attained enormous dimensions, growing not merely outwards but also inwards into the cavity of the pelvis, and displacing and incommoding the rectum and bladder. A secondary growth occurred in the lower part of the posterior mediastinum.

In the remaining case no special note was made of the presence of paralysis. But the patient, having been ailing for some months, was admitted with a tumour deep-seated in the right groin. This was attended with congestion and œdema

of the tissues around, and for some time was supposed to be an abscess; but it turned out to be a new-growth (probably sarcomatous), taking its origin from the periosteum in the venter of the ilium, and in the progress of its development extending down into the pelvis and under Poupart's ligament into the thigh. The case is interesting in many respects, but it has a special interest here, because, excepting for the absence of any remark as to paralysis (probably due to the fact that the patient was bedridden long before her death), it is almost an exact counterpart of the one immediately preceding it.

CASE 4.—*Sarcomatous tumour of periosteum of ilium and ischium, with paralysis and wasting of leg; secondary growths in lungs. Death; autopsy.*

Charles J. L., a carpenter, æt. 45, was admitted under my care on March 21, 1873.

His illness commenced in September of last year with 'rheumatic' pains in the outer side of the right thigh and in the corresponding buttock. The pains increased, the limb became weak, and he limped in his walk, but he continued at work until the end of the month. In October he stumbled while walking, and ricked his hip, from which time the pains became much more severe. At the end of December he was compelled to lie up, and was under medical treatment at home for six weeks. Subsequently he was in a hospital for five weeks, during which time the pains steadily increased, and the limb steadily wasted and lost power.

On admission the patient was suffering from pain about the right ankle and knee, but chiefly in the hip, buttock, along the outer side of the thigh, in the groin and left testicle. The muscles of the limb were wasted and weak, and the buttock was flattened. On careful examination a hard, rounded lump, apparently of the size of half a walnut, was found deep in the buttock and apparently springing from the back of the acetabulum or its immediate vicinity. It was not particularly tender on pressure. The hip-joint itself seemed healthy. There was no fracture or dislocation. The patient seemed fairly healthy in other respects.

A week or two after admission Mr. Simon saw the patient with me, and passed a bistoury into the lump, but no fluid escaped. At the end of another week or ten days Mr. Simon again examined the patient with me. By this time the lump had increased notably in size, and a rectal examination showed that it projected inwards as well as outwards, and caused obvious displacement of the bowel.

On April 19 the following note was taken :—The pain has increased greatly since admission, and the only relief the patient obtains is from the subcutaneous injection of morphia. The tumour in the buttock, which is irregular and nodulated, and extremely tender, has, roughly speaking, the size and shape of a penny bun. There are in both groins several somewhat enlarged and very hard glands. The left leg is much wasted.

The progress of the case henceforth was very rapid. The tumour grew daily, remaining hard but becoming irregular, seeming gradually to involve the whole of the ischium, and not only enlarging outwards but extending into the cavity of the pelvis, displacing the rectum and bladder, and interfering materially with micturition and defecation. Ultimately its bulk was perhaps equal to that of the head of an adult. The glands in the groins, and more especially those on the right side, progressively enlarged, but remained hard. The left lower extremity became extremely emaciated, and altogether powerless, but latterly flexed at the hip- and knee-joints. About the end of June it became also numb, and shortly before death cedematous. The right lower extremity never shared in the paralysis of its fellow; but a week or two before the other began to swell this became exceedingly cedematous and hard. He had no cough or difficulty of breathing; but a few days before his death he complained of pain in the left side of the chest; and, on the morning of the day on which he died, examination of the anterior aspect of the chest revealed some dulness with coarse crepitation at the left apex, with pneumonic consolidation of the base, and a little creaking at the right apex and along the right side of the pericardium. The back could not be examined. Heart healthy. The pain during his stay in the hospital was kept in abeyance by injections of morphia, of which, latterly, ten grains were employed daily. He became exceedingly thin, weak, and anæmic, and, though he remained sensible, very irritable.

He died of exhaustion July 30.

Autopsy.—Body thin. A large tumour projecting in right gluteal region, also felt through abdominal walls in pelvis. It was quite a foot in its largest diameter.

On opening the abdomen a rounded mass appeared rising out of the pelvis, and attached to the periosteum of the iliac bone. It was continuous below with the gluteal tumour, which was also attached to the ilium; but the brim of the pelvis formed a line of demarcation between their projecting portions. The growth extended from within through the sciatic notch, where it closely surrounded the great sciatic nerve and the gluteal vessels, and thus

became continuous with the portion of growth attached to the ilium and ischium beneath the gluteal muscles. The tumour sprang from the periosteum, but did not involve the subjacent bone, or the muscles which were stretched over it. Hip-joint natural. Rectum and bladder displaced by the tumour, but not involved in it.

A secondary growth was found, apparently in the lumbar glands, just below the diaphragm, and extending thence into the lower part of the posterior mediastinum, where it became connected with a mass in the base of the right lung. Both lungs were studded with soft, white, rounded growths, from the size of a walnut downwards; of which those abutting on the surface were umbilicated. The lungs in other respects were healthy. The right pleura presented old adhesions. Pericardium and heart healthy. Abdominal organs generally healthy. With the exception of the mass referred to above, there was no involvement of either the lumbar or the mesenteric glands.

The tumours were tough, free from juice, and in some parts presented a fibrous or irregularly reticulated character. They had the microscopic characters of spindle-celled sarcoma.

CASE 5.—*Growth, probably sarcomatous, of venter of right ilium.*
Death; autopsy.

Elizabeth C., aged 17, a laundress, was admitted under my care January 28, 1862. She has not been regular for seven months, and has been otherwise a little out of health. During the last three weeks she has had some pain in her knees and in the cardiac region, and during the last two weeks a slight cough without expectoration. Her appetite has been good, her bowels regular.

Her appetite is now good, her tongue clean. She has a slight cough, and some thoracic pain; but the chest is resonant, and the breath-sounds healthy. There is a loud systolic murmur at the apex of the heart. The pulse is 120 and regular. The pains in her limbs have disappeared. She looks weak and anæmic.

About a fortnight after admission she mentioned for the first time that she had a lump in the right groin, that it had been forming there for six months, but had never been tender or given her any discomfort. On examining the groin a convex lump (roughly speaking, about as large as a duck's egg) was discovered at its outer extremity, situated above Poupart's ligament, beneath the abdominal parietes, and adjoining the anterior spines of the ilium. It was immovable and hard, though somewhat yielding and elastic. It was not at all tender. The integuments and cellular tissue of the

thigh, over a limited area immediately below the tumour, were hardened, congested, and tender.

Up to this time there had been little appreciable change in her general health; her slight cough continued, and a little rhonchus was audible.

On February 26 the following note was taken:—'Cough about the same; looks very anæmic and ill. The lump above Poupart's ligament has extended towards the pubes, has become more superficial, and now distinctly fluctuates. The upper half of the thigh (in front and to the outside) is congested and brawny, and its integuments are coarse and peeling. There is less tenderness than there was.' I believed at this time that an abscess was forming, and in this belief I was supported by my surgical colleague. The chest was resonant, and the cardiac murmur persistent.

At the beginning of March (for about a week) she suffered from diarrhœa.

On March 8 it was remarked that 'the abscess' was getting more superficial and tender, and that there was some tension and congestion of the integuments of the inguinal region, as well as of those of the thigh; that her appetite was worse; that she was thirsty, and her tongue red and fissured; that her cough was more troublesome, and attended with scanty muco-purulent expectoration; that she slept badly; that her pulse was 120; that she was very weak and anæmic; but that still (beyond the presence of a little scattered rhonchus and subcrepitation) there were no local indications of lung-disease.

On this day a deep puncture was made into the tumour, but a little blood only escaped.

About this time she took cold, and suffered for a few days from loss of voice and sore-throat.

From this date up to the time of her death there was but little change in her general symptoms, beyond the facts that she grew weaker and thinner; that her pulse increased in rapidity (varying latterly between 136 and 148); that her breath became very short and rapid (without, however, any increase of cough or expectoration, or clear evidence of structural disease in the lungs); that latterly her tongue became dry; and that on March 26 a sudden discharge, which stained and stiffened her linen, took place from the vagina, and continued thenceforth. The cardiac murmur never disappeared.

The tumour gradually increased in prominence and extent, and to a certain degree the congestion and thickening of the surrounding integuments also increased, the integuments of the right buttock becoming involved.

On April 5 a probe was passed to a depth of an inch or two into the substance of the tumour through the incision that had been made a month previously. Its tissue was found soft and lacerable, and still nothing but a few drops of blood escaped.

By the 9th a soft, pulpy, tuberculated excrescence, about the size of a nut, had protruded from the seat of puncture. This fungus gradually increased in size, and the integuments over the more prominent parts of the tumour got congested, and evidently incorporated into it; and during the last two or three weeks of her life fungating masses began to protrude here and there from the surface.

She died on May 16.

Autopsy.—There was a little serous effusion into the pleuræ, and the lungs were collapsed, otherwise the thoracic organs were healthy. The abdominal viscera were generally healthy; but the liver was fatty, the spleen was large, and the pelvis contained much turbid yellowish fluid. A very large mass of rather hard, brain-like growth was found occupying the right side of the pelvis, reaching up into the abdomen and down into the thigh, pretty separable everywhere from the surrounding parts, but appearing to spring from the periosteum of the venter of the ilium. Its deep attachments corresponded very much to those of the psoas and iliacus, which were spread over it and atrophied. On separating the growth from the subjacent bone this was found denuded and roughened, especially in the neighbourhood of the ilio-pectineal line. It formed a fungating sore, projecting just above Poupart's ligament. The pelvic organs were healthy, and there was no secondary involvement of lymphatic glands.

In conclusion, I may say that the case with which I commenced this paper is still incomplete, and its pathology therefore still undetermined.¹ But the cases I have cited throw, I fear, a lurid light upon it. I may be permitted to hope, however, that my diagnosis is wrong. For, apart even from the wish, that every true physician feels, that he may be able to assist in restoring the apparently hopeless sufferer safe and sound to the arms of those that love him, every scientific-minded physician is only too pleased to have his diagnosis falsified, if by such falsification he advances medical knowledge or even merely corrects his own misconceptions. It is rather by our failures than by our successes that we learn.

¹ Since the above paper was placed in the hands of the printer, the patient here spoken of has died; and it has been proved that his symptoms were due to a hard sarcomatous or cancerous growth involving two or three dorsal vertebræ, which had been found tender and prominent.

*POSTSCRIPT TO
PAPER ON 'PAINFUL' PARAPLEGIA.*

I VENTURE to add the following case to my paper on 'Painful Paraplegia,' because, although the patient never suffered from intense pain, and for this reason his case hardly conforms to the title of that paper, it was really one of malignant disease of the vertebræ and consequent paraplegia, and additionally presented several phenomena of unusual interest.

The patient had suffered for many months from a large, movable, slowly growing, abdominal tumour. Then he began to complain of pain in the back and down the arms; which before long was followed by weakness and wasting of certain muscles. Five or six months later he became paraplegic; and during the progress of his paralysis a small secondary tumour was discovered in one of his ribs. In most respects the case, so far as the nervous symptoms were concerned, was a typical example of that form of paraplegia which results from progressive pressure involving the nerves and cord in the neighbourhood of the cervical enlargement. But further, in the course of his paralytic symptoms, he developed well-marked unilateral sweating of the head and neck and upper part of the trunk; and his temperature, which had been febrile for some few days before his death, rose rapidly during his last few hours, and at the time of death stood at 109·2. It is also interesting that the tumour in the abdomen, which was a sarcoma, presented a curious resemblance in its coarser features and in colour to a cirrhotic liver; while the secondary tumours, including some in the liver itself, were white. This was doubtless a mere accident, but it recalls to mind the characters presented by a cancerous hepatic tumour brought before the Pathological Society by Mr. F. T. Paul, and figured in the 36th volume of the 'Pathological Transactions.'

CASE 6.—*Sarcomatous tumour of the great omentum; secondary growths in ribs and upper dorsal and first cervical vertebra; paraplegia; unilateral sweating. Death with hyperpyrexia; autopsy.*

Edwin P., aged 25, formerly a policeman, first came under my care on May 9, 1884. His health had been uniformly good, until about eight months previously; at which time he began to suffer from occasional sickness and weakness. Last November, after an attack of faintness and vomiting, he was seized with pain in the right lumbar region, which lasted for a short time only. He now placed himself under medical care; and, from the end of November to the beginning of March, was treated in the Brighton Hospital. While there a tumour was discovered.

On admission into St. Thomas's he was a florid, tall, healthy-looking man. He complained of the presence of an abdominal tumour which he wished to have removed. But he was not suffering from pain or uneasiness; vomiting had long since ceased; and he expressed himself as feeling quite well.

The abdomen was prominent on the right side. The prominence was due to the presence of a large, solid-feeling, nodulated, ovoid tumour, which extended from just under the ribs, or $4\frac{1}{2}$ inches above the umbilicus, to the iliac fossa below, was about one third as thick as it was long, and was situated wholly to the right of the median line. It presented a slight concavity towards the left side. It was freely movable within small limits, and was not in the least tender. There appeared to be a narrow band of resonance between it and the liver, and much of its surface also was resonant. The form of the tumour, its mobility, and the resonance here and there over its surface, suggested that it might be a sarcomatous mass originating in the mesenteric glands. The abdominal walls were flaccid; there was no ascitic fluid; and so far as could be made out the abdominal viscera were healthy. The thoracic organs also were healthy. Kidneys and urine normal. No lumps of any kind were discoverable in any part of the body. Tongue clean, appetite good, bowels regular, pulse 82, temperature normal.

He remained in the hospital until the end of June. He had had occasional pain in the tumour. But no appreciable enlargement had taken place. And on leaving he appeared to be as well in every respect as he was on admission. On June 8 a trocar and cannula were passed into the tumour, which was found to be solid, and yielded only a little blood.

During the next two months he came up twice or thrice to the

hospital as an out-patient. But no change in his condition was observed.

I did not see him again until March 3, 1885, on which day he presented himself at the hospital and walked into the ward. It appeared, that about October he had begun to suffer from sickness and pains in upper part of back, right shoulder and arm; that subsequently he had had occasional pains in both arms and both sides of the chest; that the sickness had ceased six weeks before admission; and that two or three weeks later he had suffered a good deal from pain in the left arm, and the left upper arm had become weak. During the last few days he had experienced a little difficulty in walking.

On admission he was still ruddy and healthy-looking. The abdominal tumour had grown sensibly larger, and presented a few additional lobules, but it still remained firm and unyielding, slightly movable and free from pain or tenderness. He complained of pain in the upper part of the back, in the left side of the chest and down the left arm; and there was manifest loss of power in the muscles of the left shoulder, but no definite wasting, and no impairment of feeling. He suffered from slight pain down the inner side of the right upper arm, and from numbness in the right ring and little fingers. But there was no paralysis on this side. The muscles of both upper extremities were small and the grasp of the hands was weak; but with the exception of the loss of power in the left shoulder, there was no definite paralysis of any part. The patient complained that his legs were weak and that he could not walk far; but he could, nevertheless, stand and walk, could move all parts freely, and there was no pain or numbness in them. He had much weakness, however, in the back, so that he was unable to raise himself from the recumbent to the sitting posture, or in fact to sit up in bed. The tendon reflexes were obvious in the arms, and considerably exaggerated in the legs, with ankle-clonus on both sides. He had a little difficulty in passing water; yet passed it voluntarily and emptied his bladder. No tenderness on percussion in the course of the spine. The pupils were unequal, but acted to light and accommodation. No other evidences of disease, of any kind, were discovered.

The paraplegic symptoms made rapid progress. On the 12th, though still able to move his legs freely while recumbent, he was quite unable to support his weight upon them; and henceforth was confined to bed. Ankle-clonus was well marked; and about this time he began to suffer from involuntary drawing up of the legs attended with more or less severe pain in the loins. On the 30th

it was noted that he had lost all voluntary control over the lower extremities, though he still passed his evacuations naturally. About this time, also, a careful examination of his cutaneous sensibility was made; and it was found that it was manifestly blunted, but by no means lost, in all parts of the body below the third intercostal spaces in front, and below the eleventh ribs behind. Immediately above them was some hyperæsthesia; but elsewhere, including the upper extremities, sensation appeared to be perfect. The weakness in the back, which was obvious when he came in, increased with his other paraplegic symptoms, so that before long he was quite unable to shift the position of his trunk in bed. On April 10 he began to pass his evacuations unconsciously, while still retaining some power over the bladder.

There was little or no change in the condition of the left arm; the muscles of the shoulder and upper arm remained weak, so that he was unable to raise his hand above his head; but he retained perfect use of the forearm and hand. He gradually lost power in the right forearm and hand, the muscles of which manifestly wasted. Yet to the last he was able to move these parts pretty freely.

He suffered much from pain in his back, occasionally in the loins, but usually higher up; and from pain sometimes in one, sometimes in the other, but mainly in the right shoulder, and down the right arm. Sometimes also he had pains in the præcordial region. No tender spot, or bend, was ever detected in the course of the spine.

The left pupil remained larger than the right. It was noticed soon after admission that he perspired on the left side of the face, neck, and chest, and in the left arm more profusely than he did on the right side; and that on one occasion an abundant crop of miliaria appeared over the sweating surface. During the last fortnight of his life this peculiarity became more distinctly pronounced. And it was repeatedly observed, that he perspired profusely on the left side of the head and neck, and chest as low as the second interspace, while the right side was dry; that the perspiring surface was rosier than the other, and that the left side of the forehead presented a broad congested vertical band which abutted on the mesial line. The line of separation between the sweating and dry surfaces was the exact median line of the body. During this period a second crop of miliaria appeared, which, though not accurately limited to the left side, was far more copious there than on the right.

The abdominal tumour underwent no material

March 27, a swelling about the size of a small walnut was found involving the right seventh rib, about two inches to the right of its downward bend. This was soft and seemed to fluctuate; and the hinder portion of rib was traced expanding over it for a short distance. The tumour increased gradually in bulk until it acquired the size of a large walnut. About the time at which the tumour was discovered, it was noted that the left leg was œdematous; and the veins in the front abdominal and thoracic walls (mainly the epigastric) had become dilated. The œdema of the leg increased, and continued to the end. The right leg remained free.

During the patient's residence in hospital his general symptoms varied a good deal. He suffered, more especially latterly, from vomiting. He was apt to be restless at night. He complained much of the pains before adverted to, which, however, were kept in abeyance and rendered bearable by morphia injections. His pulse was generally quick, and at times rose to 130 or 140. His urine was for the most part of high specific gravity; and on one or two occasions presented a trace of albumen. During the last few days of life a bed-sore formed on the sacrum; and the urine escaped involuntarily. It was acid and did not contain pus.

For the greater part of the time he was under observation the temperature was about normal. On one or two occasions, however, it rose to 100 or a little more. On April 15 it reached 102·6. On the 19th it again rose to 102·2. On the 20th it rose in the afternoon to 102·6. And from this time until his death, a little after 5 A.M. on the 22nd, the rise was progressive. On the morning of the 21st it was 103; at 4 P.M. 104·4; at 8 P.M. 105·2; at midnight 106·2; at 3 A.M. on the 22nd, 107; and at 5 A.M. 109·2.

Post-mortem Examination.—The body was thin; and the muscles of the right hand and forearm were atrophied.

On opening the abdominal cavity, a very large, ovoid, somewhat lobulated tumour was found occupying its right half. It had originated in the omentum, was adherent to the lower edge of the liver above, but not incorporated with it, and freely movable. The transverse colon wound round its lower border. The tumour was somewhat firm; and its section had much resemblance to that of a hobnailed liver. The nodules presented great variety of colour: some were deep red from extreme vascularity; others were brown or mottled; but the majority were of different shades of green, which colour was the predominant colour of the tumour. As before stated, there was no direct connection between the liver and the tumour, so that the colour was not due to any biliary infiltration or hepatic influence. The tumour was a sarcoma. The liver presented numerous

secondary growths of small size, all of which were white. All the other abdominal viscera were healthy. And, excepting that the lungs were œdematous, the thoracic organs also were healthy.

From the front of the first and second dorsal vertebræ, an irregular tumour projected into the posterior mediastinum; and, on the same level, masses of adventitious growth were found in the muscular tissue between the spinous and transverse processes. Similar masses were observed also among the posterior cervical muscles. The posterior part of the body of the seventh cervical vertebra and its spine were infiltrated with the growth. The body of the first dorsal was infiltrated throughout; and so also, in a greater or less degree, were its arches and spinous process. The fourth dorsal was wholly destroyed, and presented only half its normal thickness. The spinal canal between the seventh cervical and fourth dorsal vertebræ, inclusive, was occupied to a large extent by the growth, which compressed the cord, but did not invade it.

The azygos vein in the neighbourhood of the vertebral tumour, though apparently not directly connected with it, was plugged with a mass of new growth. Several of the ribs were the seat of tumours originating in their substance, and forming rounded or ovoid tumours from the size of a walnut downwards. Most of these were found between the angles of the ribs and the vertebræ. The largest of them was the one recognised during life and connected with the seventh rib. In the left psoas muscle was a tumour about as large as a walnut, which also involved one of the adjoining vertebræ. And the left common iliac vein was plugged with an adherent clot. This was dark, but becoming brown; and in the centre pale. The left leg was œdematous.

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